CAPA830

Intel® Atom™ D2550/N2800/N2600 Processor 3.5” SBC

User’s Manual

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ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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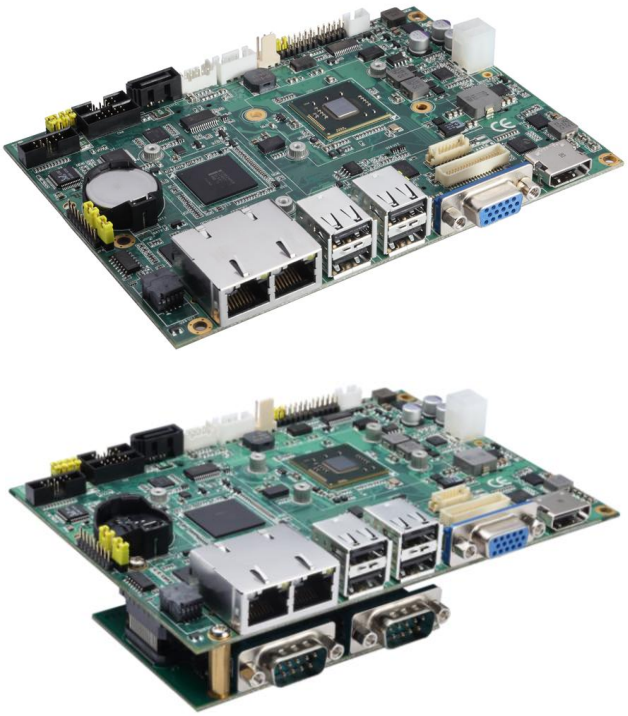
Chapter 1
Introduction



The CAPA830, a Capa board, supports Intel® Atom™ D2550/N2800/N2600 processors. The board integrates the Intel® NM10 chipset and delivers outstanding system performance through high-bandwidth interfaces, multiple I/O functions for interactive applications and various embedded computing solutions.

There is one 204-pin unbuffered SO-DIMM socket for single channel DDR3 800/1066MHz memory, maximum memory capacity up to 4GB (N2600 supports DDR3 800MHz up to 2GB only). It also features two Gigabit/Fast Ethernet ports, one serial ATA channels for total one Serial ATA hard drive at maximum transfer rate up to 300MB/sec, six USB 2.0 high speed compliant, and built-in HD audio codec that can achieve the best stability and reliability for industrial applications. Additionally, it provides you with unique embedded features, such as two serial ports and 3.5" form factor that applies an extensive array of PC peripherals.

Moreover, the CAPA830 is in ZIO form factor which provides a flexible and functional design for single board embedded systems. It is a solution for those who face limited expandability from the use of conventional single board designs and has ability to extend I/O modules in a flexible manner.

1.1 Features

- Intel® Atom™ dual core D2550 (1.86 GHz), N2800 (1.86GHz) and N2600 (1.6GHz)
- Intel® NM10 chipset
- 1 DDR3 SO-DIMM supports up to 4GB memory capacity
- 6 USB 2.0 ports
- 2 COM ports
- ZIO connector
- +12V only DC-in supported

1.2 Specifications

- **CPU**
  - Intel® Atom™ dual core D2550 1.86 GHz.
  - Intel® Atom™ dual core N2800 1.86 GHz.
  - Intel® Atom™ dual core N2600 1.6 GHz

- **Thermal Solution**
  - With Atom™ dual core D2550 1.86 GHz as fan solution.
  - With Atom™ dual core N2800 1.86 GHz or dual core N2600 1.6GHz as fanless solution

- **System Chipset**
  - Intel® NM10 chipset.

- **BIOS**
  - American Megatrends Inc. UEFI (Unified Extensible Firmware Interface) BIOS.
  - 16Mbit SPI Flash, DMI, Plug and Play.
  - RPL/PXE Ethernet Boot ROM.

- **System Memory**
  - One 204-pin unbuffered DDR3 SO-DIMM socket.
  - Maximum up to 4GB DDR3 1066MHz memory for D2550/N2800.
  - Maximum up to 2GB DDR3 800MHz memory for N2600.

- **Onboard Multi I/O**
  - Controller: Fintek F81801U.
  - Serial Ports: One port for RS-232/422/485 and one port for RS-232.

- **Serial ATA**
  - One SATA-300 connector.
  - One CFast™ socket.
  - mSATA support (Optional)

- **USB Interface**
  - Six USB ports with fuse protection and complies with USB Spec. Rev. 2.0.

- **Display**
  - A slim type 15-pin D-Sub connector as VGA connector.
  - One 40-pin connector for 18/24-bit single/dual channel LVDS and one 8-pin inverter connector. For N2600/N2800, LVDS resolution is up to 1600x1200 in 24-bit dual channel. For D2550, LVDS resolution is up to 1920x1200 in 24-bit dual channel.
  - One HDMI port.

- **Trusted Platform Module (TPM)**
  - Controller: Infineon SLB9635 via LPC bus interface.
  - Complies with TPM1.2 main and PC client specification.

- **Watchdog Timer**
  - 1~255 seconds or minutes; up to 255 levels.

- **Ethernet**
  - Two ports with Intel® 82583V for Gigabit/Fast Ethernet.

- **Audio**
  - HD audio compliant (with MIC-in/line-in/line-out) with Realtek ALC662.
  - MIC-in/line-in/line-out via box header connector.

- **Expansion Interface**
  - One PCI-Express Mini Card socket which complies with PCI-Express Mini Card Spec. V1.2.

- **ZIO Connector**
  - 60-pin high speed connector; containing one PCI Express x1, one USB2.0, one LPC and one SMBus.

- **Power Input**
  - 2x2-pin connector.
  - +12V DC-in only.
  - AT auto power on function supported.

- **Power Management**
  - ACPI (Advanced Configuration and Power Interface).

- **Form Factor**
  - 3.5" form factor.
  - ZIO form factor.

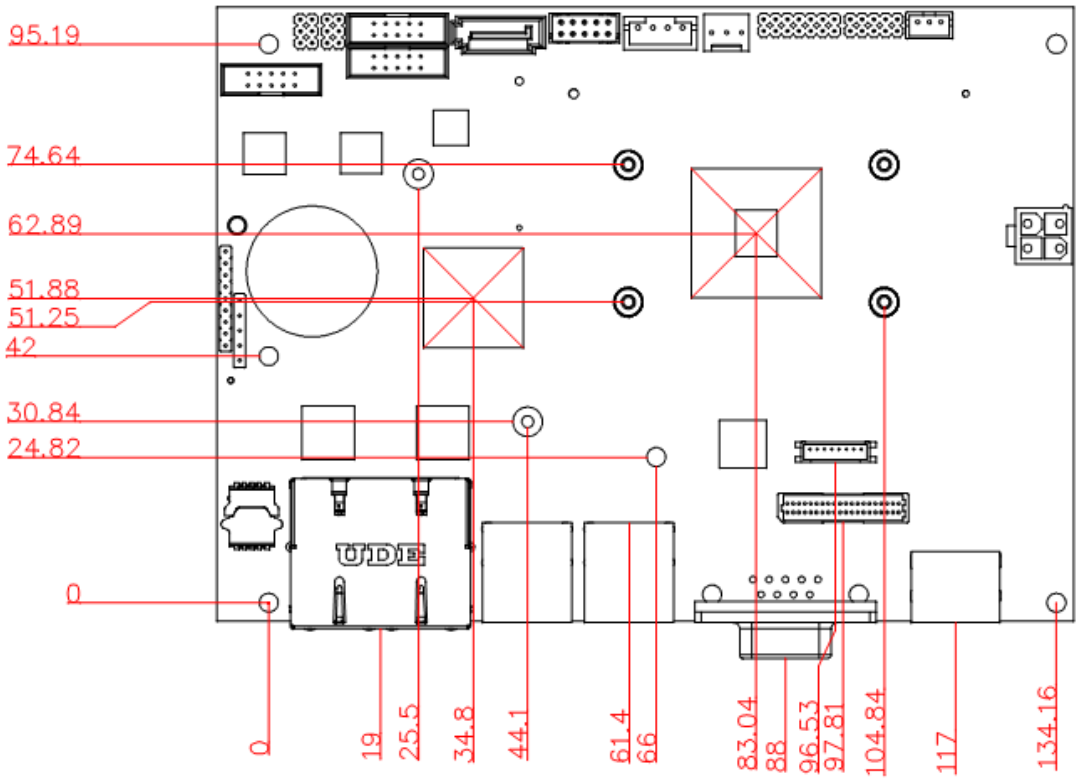
Note: ***All specifications and images are subject to change without notice.***

1.3 Utilities Supported

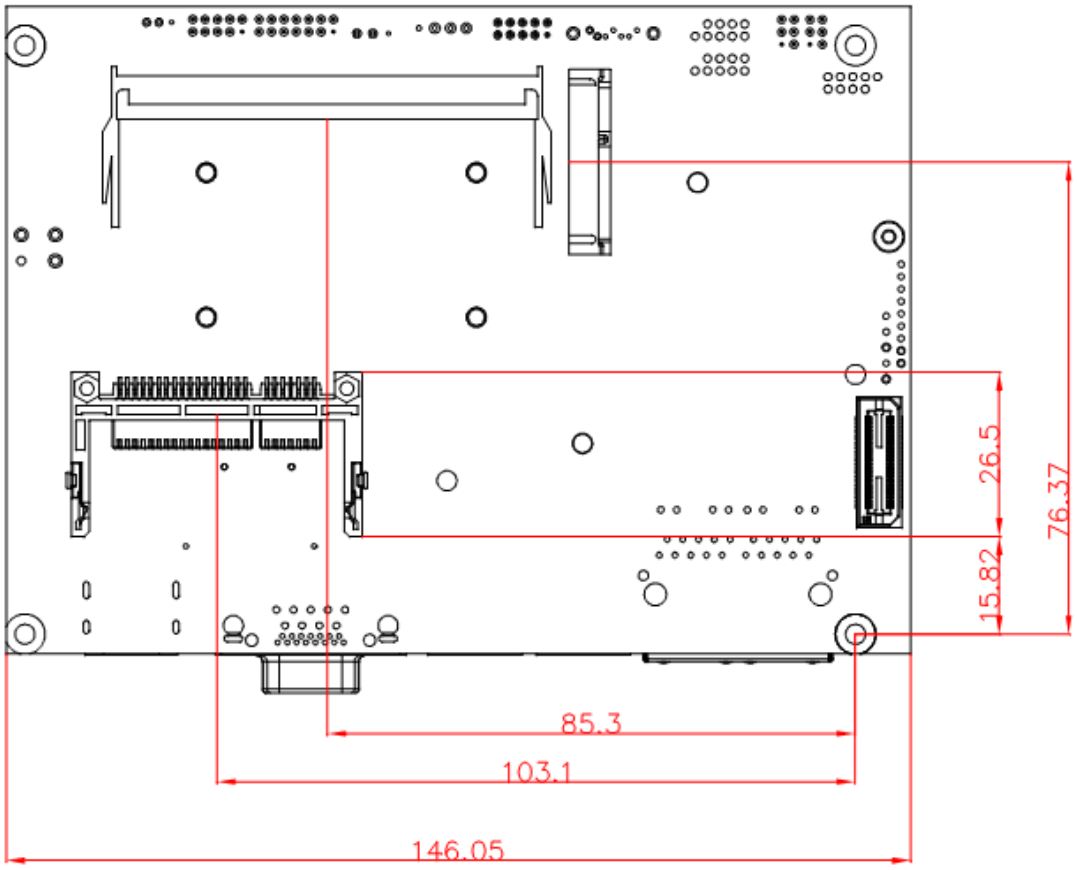
- Chipset and graphics driver
- Ethernet driver (82583V)
- Audio driver
- TPM utility
- Unify API for hardware monitor, digital I/O and watchdog timer

Chapter 2
Board and Pin Assignments

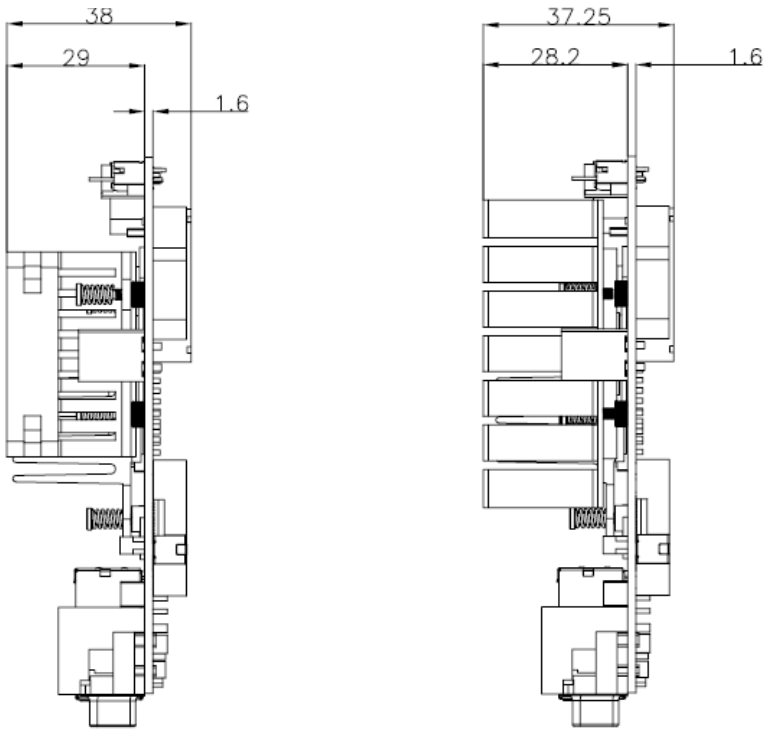
2.1 Board Dimensions and Fixing Holes



Top View

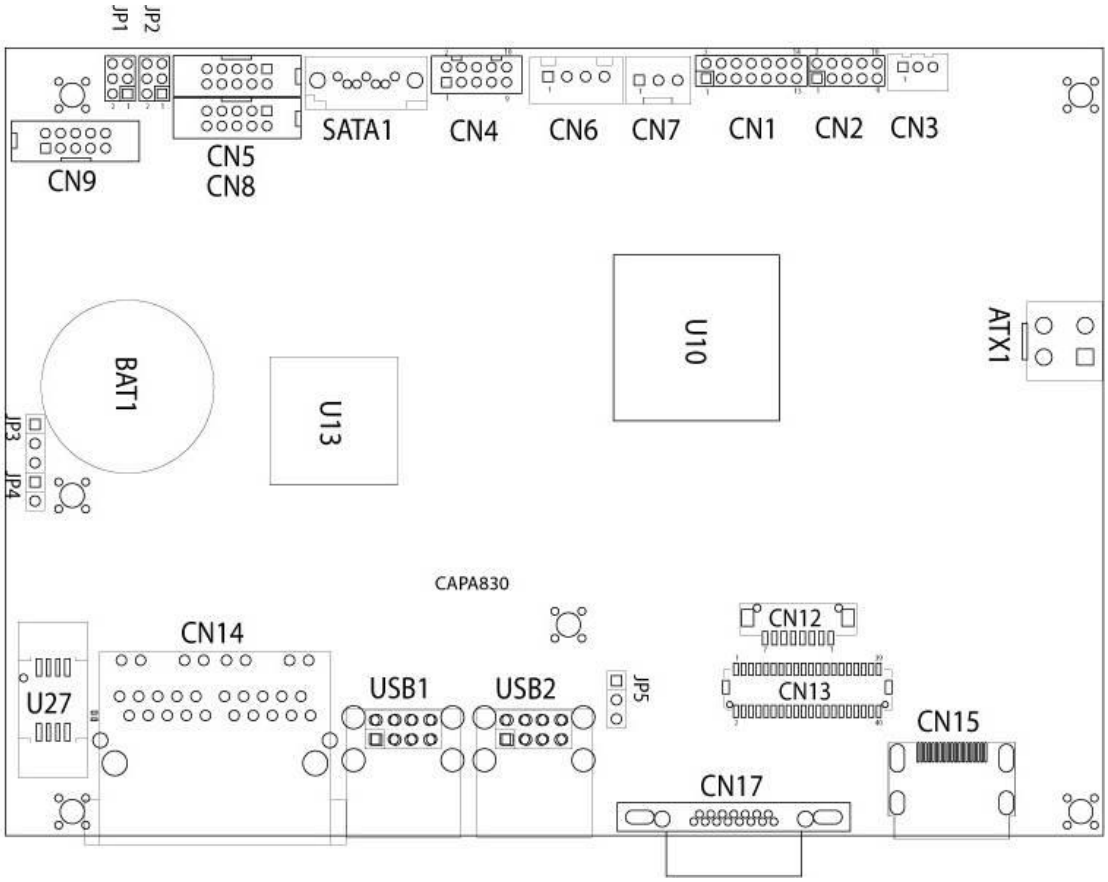


Bottom View

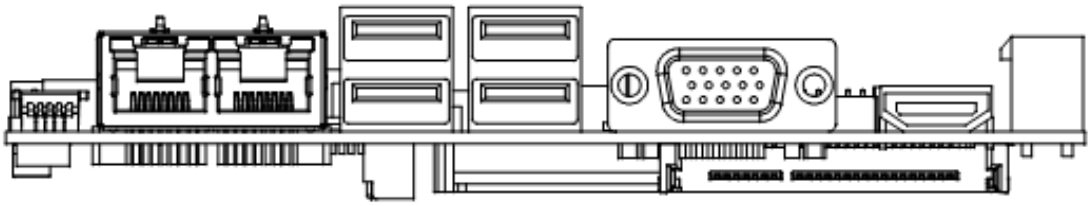


Side View

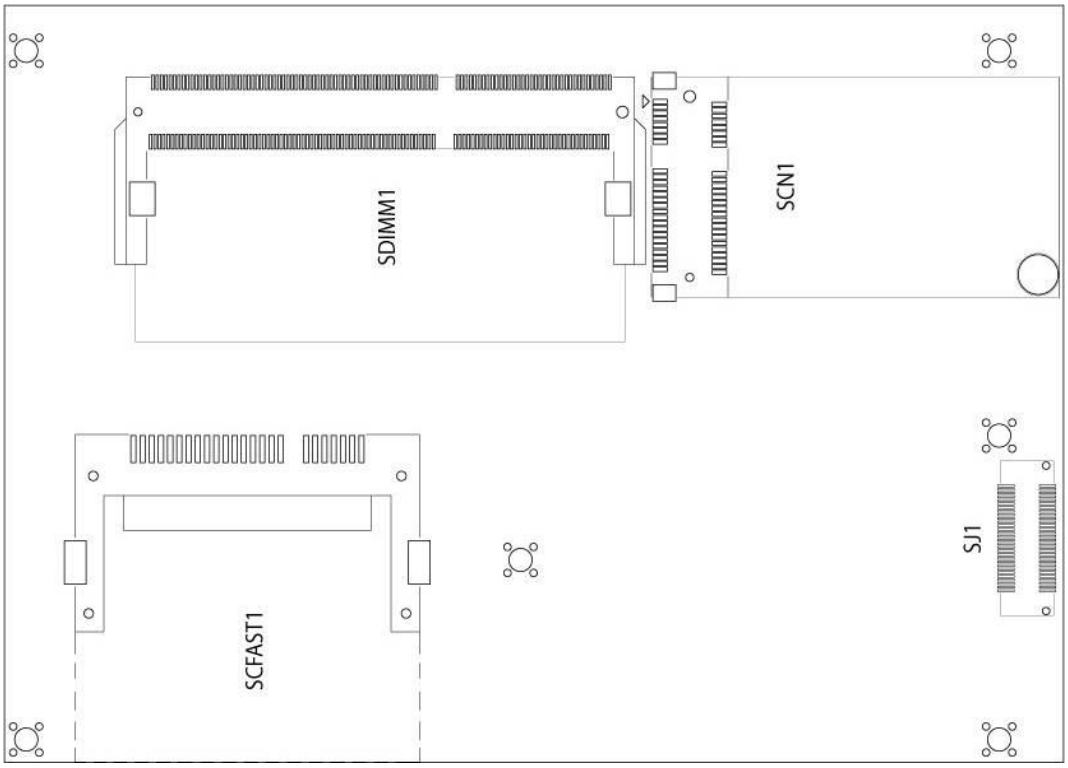
2.2 Board Layout



Top View



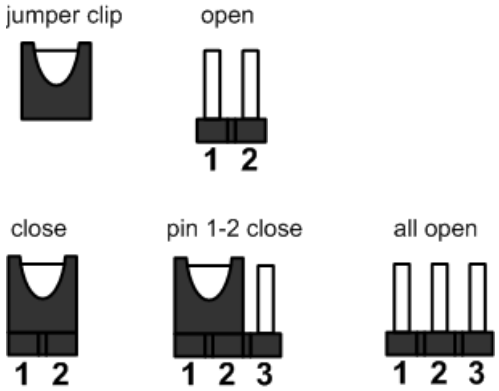
Side View



Bottom View

2.3 Jumper Settings

Jumper is a small component consisting of jumper clip and jumper pins. Install jumper clip on 2 jumper pins to close. And remove jumper clip from 2 jumper pins to open. Below illustration shows how to set up jumper.



Properly configure jumper settings on the CAPA830 to meet your application purpose. Below you can find a summary table of all jumpers and onboard default settings.

Note: Once the default jumper setting needs to be changed, please do it under power-off condition.

Jumper	Description		Setting
JP1	COM1 Data/Power Selection Default: RS-232 Data	CN8 Pin 1: DCD	3-5 Close
		CN8 Pin 8: RI	4-6 Close
JP2	COM2 Data/Power Selection Default: RS-232 Data	CN5 Pin 1: DCD	3-5 Close
		CN5 Pin 8: RI	4-6 Close
JP3	Restore BIOS Optimal Defaults Default: Normal Operation		1-2 Close
JP4	Auto Power On Default: Disable		Close
JP5	LVDS Voltage Selection Default: +3.3V Level		1-2 Close

2.3.1 COM1 Data/Power Selection (JP1)

The COM1 port has +5V level power capability on DCD and +12V level on RI by setting this jumper. When this port is set to +5V or +12V level, please make sure its communication mode is RS-232 (see section 4.4).

Function	Setting
Power: Set CN8 pin 1 to +5V level	1-3 close
Data: Set CN8 pin 1 to DCD (Default)	3-5 close
Power: Set CN8 pin 8 to +12V level	2-4 close
Data: Set CN8 pin 8 to RI (Default)	4-6 close

2.3.2 COM2 Data/Power Selection (JP2)

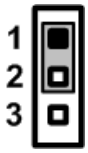
The COM2 port has +5V level power capability on DCD and +12V level on RI by setting this jumper.

Function	Setting
Power: Set CN5 pin 1 to +5V level	1-3 close
Data: Set CN5 pin 1 to DCD (Default)	3-5 close
Power: Set CN5 pin 8 to +12V level	2-4 close
Data: Set CN5 pin 8 to RI (Default)	4-6 close

2.3.3 Restore BIOS Optimal Defaults (JP3)

Put jumper clip to pin 2-3 for a few seconds then move it back to pin 1-2. Doing this procedure can restore BIOS optimal defaults.

Function	Setting
Normal (Default)	1-2 close
Restore BIOS optimal defaults	2-3 close



2.3.4 Auto Power On (JP4)

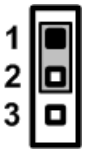
If JP4 is enabled for AC power input, the system will be automatically power on without pressing soft power button. If JP4 is disabled for AC power input, it is necessary to manually press soft power button to power on the system.

Function	Setting
Disable auto power on (Default)	Close
Enable auto power on	Open

2.3.5 LVDS Voltage Selection (JP5)

The board supports voltage selection for flat panel displays. Use JP5 to set LVDS connector (CN13) pin 1~6 VCCM to +3.3V or +5V voltage level.

Function	Setting
+3.3V level (Default)	1-2 close
+5V level	2-3 close



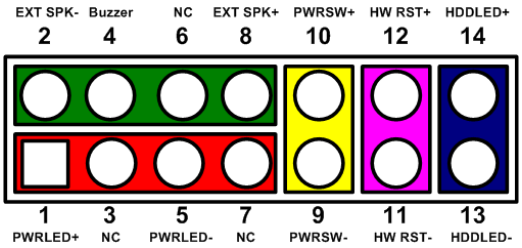
2.4 Connectors

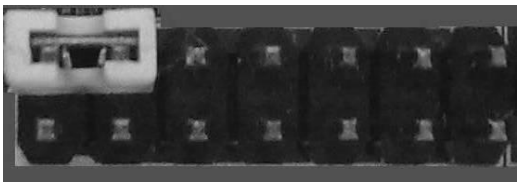
Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table which shows all connectors on the hardware.

Connector	Description
CN1	Front Panel Connector
CN2	Digital I/O Connector
CN3	SMBus Connector
CN4	USB Wafer Port 4 and 5
CN5	COM2 Connector
CN6	Power Output Connector
CN7	CPU Fan Connector
CN8	COM1 Connector
CN9	Audio Connector
CN12	Inverter Connector
CN13	LVDS Connector
CN14	Ethernet Port 1 and 2
CN15	HDMI Connector
CN17	VGA Connector
ATX1	Power Connector
SATA1	Serial ATA Connector
USB1	USB Port 2 and 3
USB2	USB Port 0 and 1
SCFAST1	CFast™ Socket
SCN1	PCI-Express Mini Card and mSATA Connector
SDIMM1	DDR3 SO-DIMM Connector
SJ1	ZIO Expansion Connector

2.4.1 Front Panel Connector (CN1)

Pin	Signal
1	PWRLED+
2	EXT SPK-
3	N.C.
4	Buzzer
5	PWRLED-
6	N.C.
7	N.C.
8	EXT SPK+
9	PWRSW-
10	PWRSW+
11	HW RST-
12	HW RST+
13	HDDLED-
14	HDDLED+





Power LED
Pin 1 connects anode(+) of LED and pin 5 connects cathode(-) of LED. The power LED lights up when the system is powered on.

External Speaker and Internal Buzzer
Pin 2, 4, 6 and 8 connect the case-mounted speaker unit or internal buzzer. While connecting the CPU board to an internal buzzer, please set pin 2 and 4 closed; while connecting to an external speaker, you need to set pins 2 and 4 opened and connect the speaker cable to pin 8(+) and pin 2(-).

Power On/Off Button
Pin 9 and 10 connect the power button on front panel to the CPU board, which allows users to turn on or off power supply.

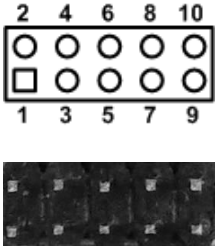
System Reset Switch
Pin 11 and 12 connect the case-mounted reset switch that reboots your computer without turning off the power switch. It is a better way to reboot your system for a longer life of system power supply.

HDD Activity LED
This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 13 and 14 connect the hard disk drive to the front panel HDD LED, pin 13 is assigned as cathode(-) and pin 14 is assigned as anode(+).

2.4.2 Digital I/O Connector (CN2)

The board is equipped with an 8-channel (3 inputs and 5 outputs) digital I/O connector that meets requirements for a system customary automation control. The digital I/O can be configured to control cash drawers and sense warning signals from an Uninterrupted Power System (UPS), or perform store security control. You may use software programming to control these digital signals.

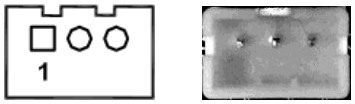
Pin	Signal	Pin	Signal
1	Digital Input 0	2	Digital Output 0
3	Digital Input 1	4	Digital Output 1
5	Digital Input 2	6	Digital Output 2
7	GND	8	Digital Output 3
9	GND	10	Digital Output 4



2.4.3 SMBus Connector (CN3)

This connector is for SMBus interface. The SMBus (System Management Bus) is a simple 2-wire bus for the purpose of lightweight communication.

Pin	Signal
1	CLK
2	DATA
3	GND

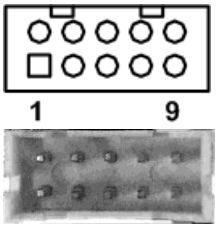


2.4.4 USB Wafer Connector (CN4)

These 2x5 pin wafer is Universal Serial Bus (USB) connector. It is for installing versatile USB 2.0 compliant interface peripherals.

CN4 carries USB port 4 and 5.

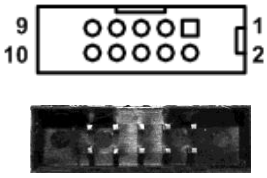
Pin	Signal	Pin	Signal
1	USB VCC (+5V level)	2	USB VCC (+5V level)
3	USB #4_D-	4	USB #5_D-
5	USB #4_D+	6	USB #5_D+
7	GND	8	GND
9	GND	10	GND



2.4.5 COM2 Connector (CN5)

This connector is equipped with +5V level power capability on DCD and +12V level on RI by setting JP2 (see section 2.3.2).

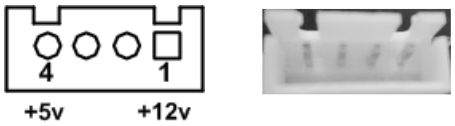
Pin	Signal	Pin	Signal
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	N.C.



2.4.6 Power Output Connector (CN6)

Use CN6 for interfacing to SATA 2.5" HDD power supply.

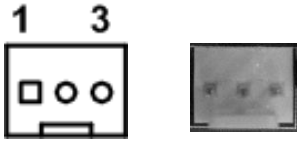
Pin	Signal
1	+12V level
2	GND
3	GND
4	+5V level



2.4.7 CPU Fan Connector (CN7)

A CPU fan interface is available through this connector. You can find fan speed on BIOS Setup Utility if CPU fan is installed. For further information, see BIOS Setup Utility: Advanced\H/W Monitor\PC Health Status (see section 4.4).

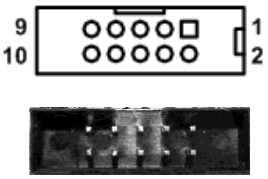
Pin	Signal
1	GND
2	+12V level
3	Fan speed feedback



2.4.8 COM1 Connector (CN8)

This connector has +5V level power capability on DCD and +12V level on RI by setting JP1 (see section 2.3.1). The pin assignments of RS-232/RS-422/RS-485 are listed in table below. If you need COM1 port to support RS-422 or RS-485, please refer to section 4.4.

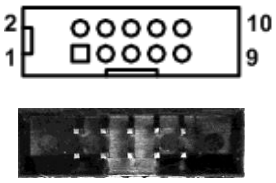
Pin	RS-232	RS-422	RS-485
1	DCD	TX-	Data-
2	DSR	No use	No use
3	RXD	TX+	Data+
4	RTS	No use	No use
5	TXD	RX+	No use
6	CTS	No use	No use
7	DTR	RX-	No use
8	RI	No use	No use
9	GND	No use	No use
10	No use	No use	No use



2.4.9 Audio Connector (CN9)

The audio interface is available through CN9.

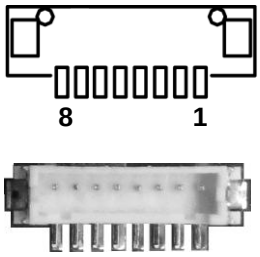
Pin	Signal	Pin	Signal
1	MIC_IN	2	GND
3	LINE_IN_L	4	GND
5	LINE_IN_R	6	GND
7	AUDIO_OUT_L	8	GND
9	AUDIO_OUT_R	10	GND



2.4.10 Inverter Connector (CN12)

This is a DF13-8S-1.25C 8-pin connector for inverter. We strongly recommend you to use the matching DF13-8S-1.25C connector to avoid malfunction.

Pin	Signal
1	VBL1 (+12V level)
2	VBL1 (+12V level)
3	VBL2 (+5V level)
4	VBL_ENABLE
5	GND
6	GND
7	GND
8	VBL Brightness Control

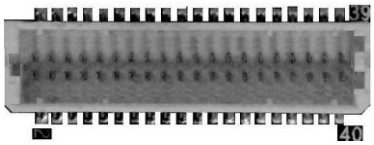


2.4.11 LVDS Connector (CN13)

This board has a 40-pin connector for LVDS LCD interface. It is strongly recommended to use the matching JST SHDR-40VS-B 40-pin connector for LVDS interface. Pin 1~6 VCCM can be set to +3.3V level or +5V level by setting JP5 (see section 2.3.5).

18-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	N.C.	12	N.C.
13	N.C.	14	N.C.
15	GND	16	GND
17	N.C.	18	N.C.
19	N.C.	20	N.C.
21	GND	22	GND
23	Channel A D0-	24	N.C.
25	Channel A D0+	26	N.C.
27	GND	28	GND
29	Channel A D1-	30	N.C.
31	Channel A D1+	32	N.C.
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND



24-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	N.C.	12	N.C.
13	N.C.	14	N.C.
15	GND	16	GND
17	N.C.	18	N.C.
19	N.C.	20	N.C.
21	GND	22	GND
23	Channel A D0-	24	N.C.
25	Channel A D0+	26	N.C.
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

18-bit dual channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	N.C.	12	Channel B D0-
13	N.C.	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	N.C.
31	Channel A D1+	32	N.C.
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

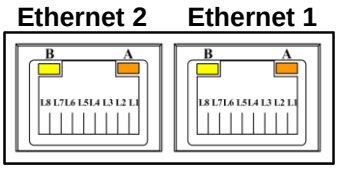
24-bit dual channel

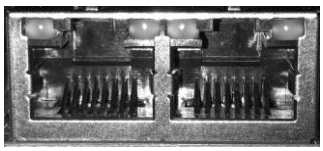
Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	Channel B D3-	12	Channel B D0-
13	Channel B D3+	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

2.4.12 Ethernet Port (CN14)

The board has dual RJ-45 ethernet connectors. Connection can be established by plugging one end of the ethernet cable into this RJ-45 connector and the other end (phone jack) to a 1000/100/10-Base-T hub.

Pin	Signal	Pin	Signal
L1	MDI0+	L5	MDI2-
L2	MDI0-	L6	MDI1-
L3	MDI1+	L7	MDI3+
L4	MDI2+	L8	MDI3-
A	100 LAN LED (Green) / 1000 LAN LED (Orange)		
B	Active LED (Yellow)		

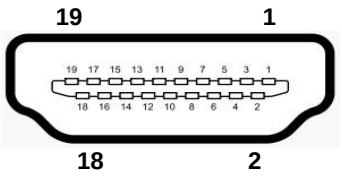




2.4.13 HDMI Connector (CN15)

The HDMI (High-Definition Multimedia Interface) is a compact digital interface which is capable of transmitting high-definition video and high-resolution audio over a single cable. Its interface is available through connector CN15.

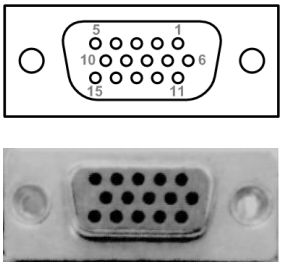
Pin	Signal	Pin	Signal
1	HDMI DATA2+	2	GND
3	HDMI DATA2-	4	HDMI DATA1+
5	GND	6	HDMI DATA1-
7	HDMI DATA0+	8	GND
9	HDMI DATA0-	10	HDMI Clock+
11	GND	12	HDMI Clock-
13	N.C.	14	N.C.
15	HDMI SCL	16	HDMI SDA
17	GND	18	+5V
19	HDMI_HTPLG		



2.4.14 VGA Connector (CN17)

The CN17 is a slim type 15-pin D-Sub connector which is commonly used for CRT VGA monitor. This VGA interface configuration can be configured via software utility.

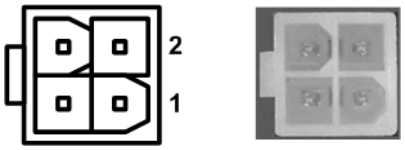
Pin	Signal	Pin	Signal
1	Red	2	Green
3	Blue	4	N.C.
5	GND	6	DETECT
7	GND	8	GND
9	VCC	10	GND
11	N.C.	12	DDC DATA
13	Horizontal Sync	14	Vertical Sync
15	DDC CLK		



2.4.15 Power Connector (ATX1)

The ATX1 is a 4-pin power supply interface. External power supply plug fits into ATX1 in only one orientation. Properly press down power supply plug until it completely and firmly fits into this connector. Loose connection may cause system instability.

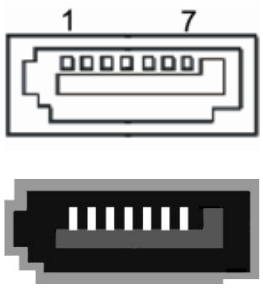
Pin	Signal
1	GND
2	GND
3	+12V
4	+12V



2.4.16 Serial ATA Connector (SATA1)

This Serial Advanced Technology Attachment (Serial ATA or SATA) connector is for high-speed SATA interface port. It is computer bus interface for connecting to devices such as hard disk drives.

Pin	Signal
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND

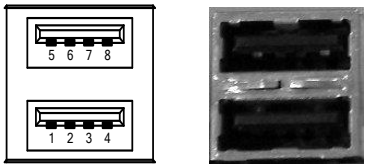


2.4.17 USB Connectors (USB1 and USB2)

These Universal Serial Bus (compliant with USB 2.0 (480Mbps)) connectors on the rear I/O are for installing USB peripherals such as keyboard, mouse, scanner, etc.

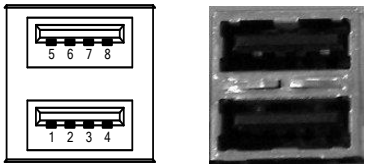
Pin	Signal	Pin	Signal
1	USB VCC (+5V level)	5	USB VCC (+5V level)
2	USB #2_D-	6	USB #3_D-
3	USB #2_D+	7	USB #3_D+
4	GND	8	GND

USB1



Pin	Signal	Pin	Signal
1	USB VCC (+5V level)	5	USB VCC (+5V level)
2	USB #0_D-	6	USB #1_D-
3	USB #0_D+	7	USB #1_D+
4	GND	8	GND

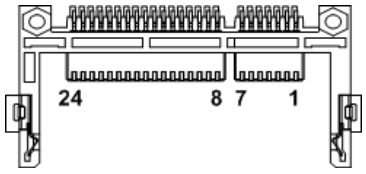
USB2

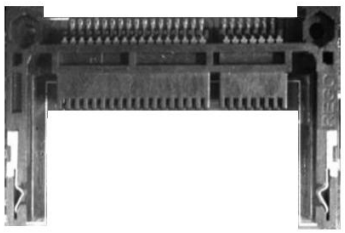


2.4.18 CFast™ Socket (SCFAST1)

The board is equipped with a CFast™ socket on the bottom side to support a CFast™ card which is based on the Serial ATA bus. The socket is specially designed to avoid incorrect installation of the CFast™ card. When installing or removing the CFast™ card, please make sure the system power is off. The CFast™ card by default identifies itself as C: or D: drive in your PC system.

Pin	Signal	Pin	Signal
1	GND	13	N.C
2	SATA_TX+	14	GND
3	SATA_TX-	15	N.C
4	GND	16	N.C
5	SATA_RX-	17	N.C
6	SATA_RX+	18	N.C
7	GND	19	N.C
8	N.C	20	+3.3V Level
9	GND	21	+3.3V Level
10	N.C	22	GND
11	N.C	23	GND
12	N.C	24	N.C





Note: ***If mSATA is enabled, the CFast™ socket can't function.***

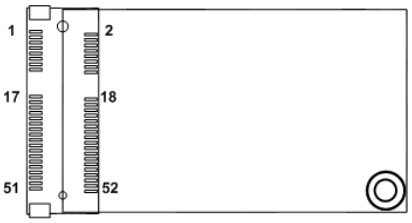
2.4.19 PCI-Express Mini Card and mSATA Connector (SCN1)

This is a PCI-Express Mini Card connector which supports PCI-Express x1 link ,SATA link and USB 2.0 link. A PCI-Express Mini Card can be applied to either PCI-Express or USB 2.0 or SATA. It complies with PCI-Express Mini Card Spec. V1.2.

It can also support mSATA. Please check section 4.4 to enable it.

Note: ***If mSATA is enabled, the CFast™ socket can't function.***

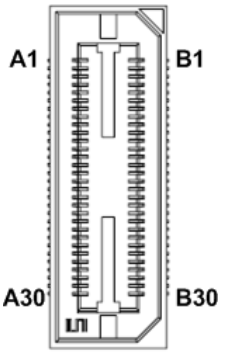
Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3VSB
3	No use	4	GND
5	No use	6	+1.5V
7	CLKREQ#	8	No use
9	GND	10	No use
11	REFCLK-	12	No use
13	REFCLK+	14	No use
15	GND	16	No use
17	No use	18	GND
19	No use	20	W_DISABLE#
21	GND	22	PERST#
23	PE_RXN3/ SATA_RXP	24	+3.3VSB
25	PE_RXP3/ SATA_RXN	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN3/ SATA_TXN	32	SMB_DATA
33	PE_TXP3/ SATA_TXP	34	GND
35	GND	36	USB #6_D-
37	GND	38	USB #6_D+
39	+3.3VSB	40	GND
41	+3.3VSB	42	No use
43	GND	44	No use
45	No use	46	No use
47	No use	48	+1.5V
49	No use	50	GND
51	No use	52	+3.3VSB



2.4.20 ZIO Expansion Connector (SJ1)

The SJ1 is for connecting CPU board to ZIO expansion module such as AX93262. (See Appendix A for the details of AX93262.)

Pin	Signal	Pin	Signal
A1	+12V	B1	GND
A2	+5VSB	B2	GND
A3	+5VSB	B3	GND
A4	+3.3VSB	B4	GND
A5	+3.3VSB	B5	RSVD
A6	RSVD	B6	RSVD
A7	PWROK	B7	RSVD
A8	SMB_CLK	B8	RSVD
A9	SMB_DATA	B9	GND
A10	GND	B10	PCI-E TXP4
A11	PCI-E RXP4	B11	PCI-E TXN4
A12	PCI-E RXN4	B12	WAKE_N
A13	USBOC_N	B13	PCI-E CLKP
A14	USB #7_D+	B14	PCI-E CLKN
A15	USB #7_D-	B15	GND
A16	No Use	B16	CLK_33M
A17	No Use	B17	SERIRQ
A18	GND	B18	LAD0
A19	No Use	B19	LAD1
A20	No Use	B20	LAD2
A21	PLTRST_N	B21	LAD3
A22	No Use	B22	L_FRAME
A23	No Use	B23	GND
A24	GND	B24	No Use
A25	No Use	B25	No Use
A26	No Use	B26	No Use
A27	No Use	B27	No Use
A28	No Use	B28	GND
A29	GND	B29	No Use
A30	No Use	B30	No Use



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Chapter 3
Hardware Description

3.1 Microprocessors

The CAPA830 supports Intel® Atom™ D2550/N2800/N2600 processors, which enable your system to operate under Windows® 7 environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for your installed microprocessor to prevent the CPU from damages.

3.2 BIOS

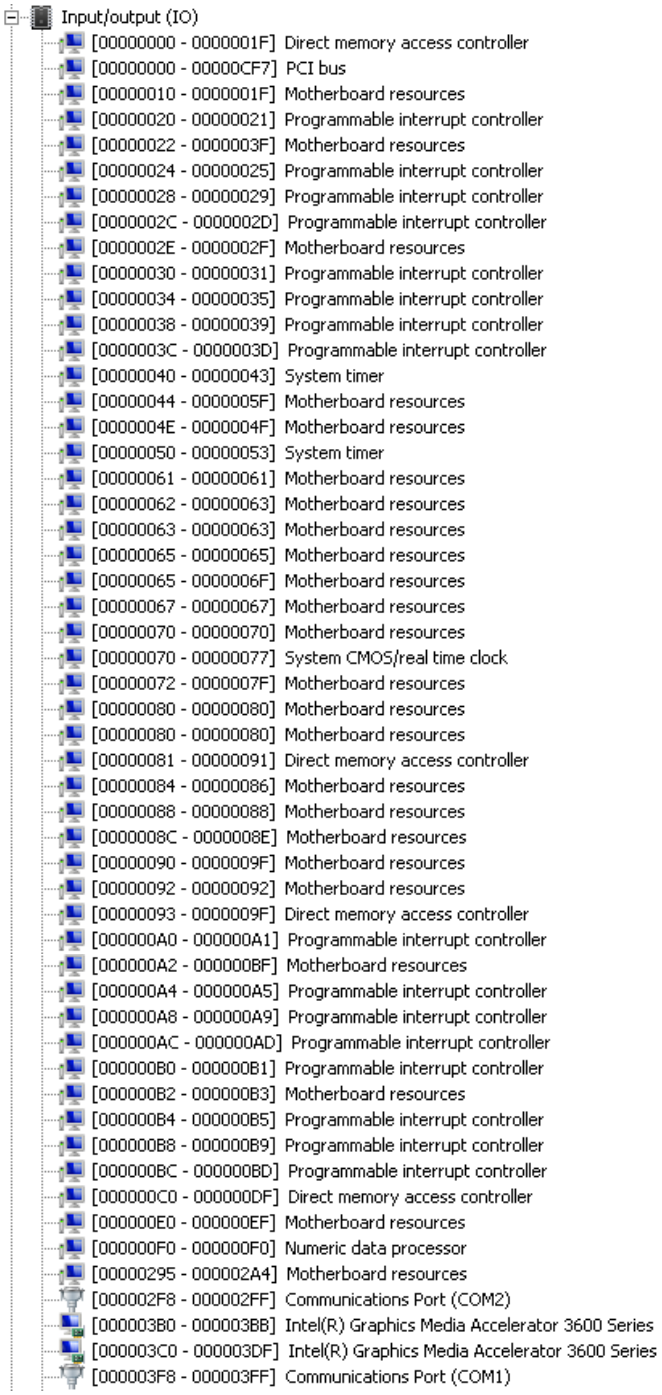
The CAPA830 uses AMI Plug and Play BIOS with a single 16Mbit SPI Flash.

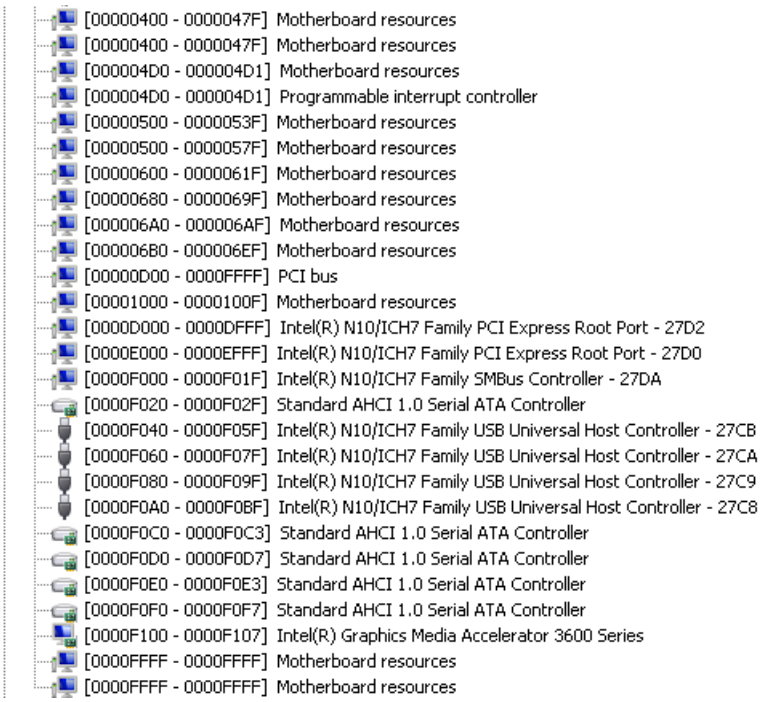
3.3 System Memory

The CAPA830 supports one 204-pin DDR3 SO-DIMM socket for a maximum memory of 4GB DDR3 SDRAMs. The memory module comes in sizes of 1GB, 2GB and 4GB.

3.4 I/O Port Address Map

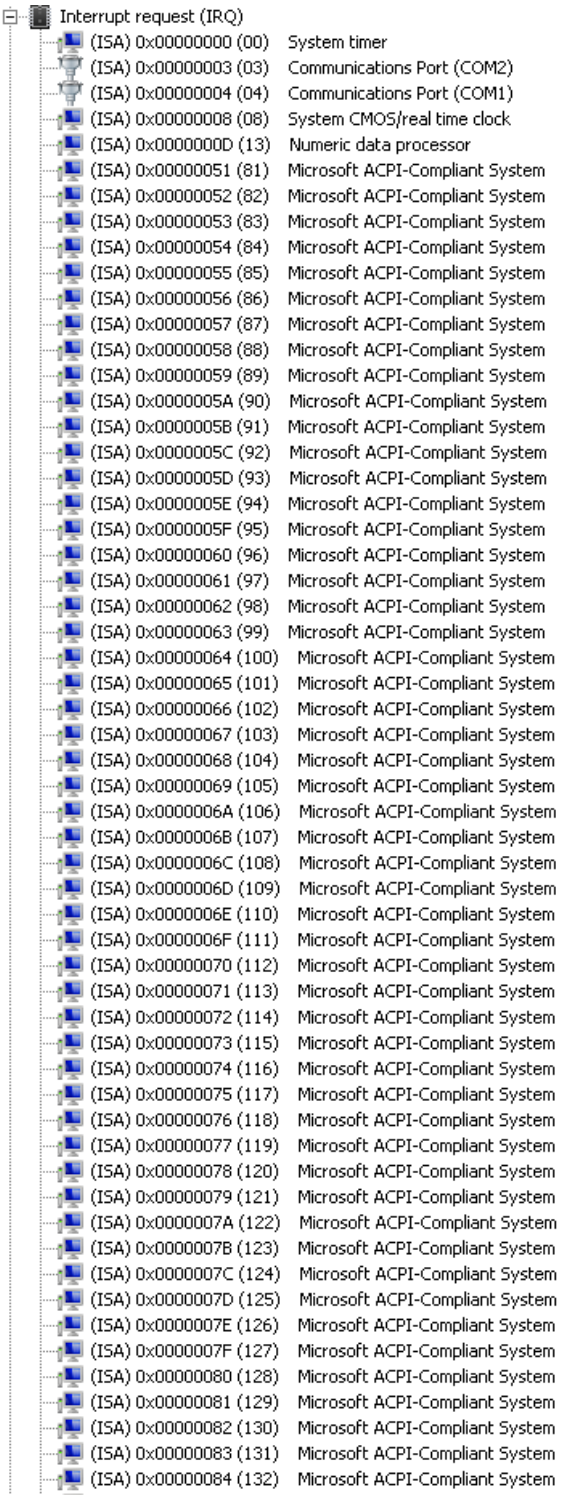
The Intel® Atom™ D2550/N2800/N2600 processors communicate via I/O ports. Total 1KB port addresses are available for assigning to other devices via I/O expansion cards.

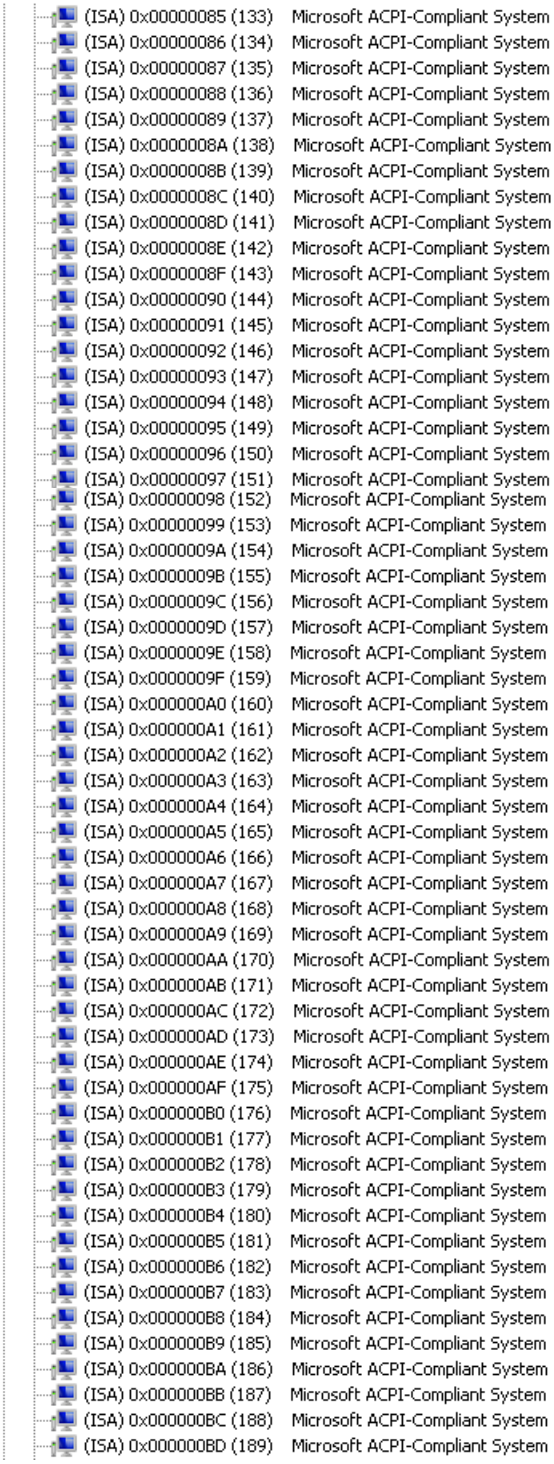

Input/output (IO)
[00000000 - 0000001F] Direct memory access controller
[00000000 - 00000CF7] PCI bus
[00000010 - 0000001F] Motherboard resources
[00000020 - 00000021] Programmable interrupt controller
[00000022 - 0000003F] Motherboard resources
[00000024 - 00000025] Programmable interrupt controller
[00000028 - 00000029] Programmable interrupt controller
[0000002C - 0000002D] Programmable interrupt controller
[0000002E - 0000002F] Motherboard resources
[00000030 - 00000031] Programmable interrupt controller
[00000034 - 00000035] Programmable interrupt controller
[00000038 - 00000039] Programmable interrupt controller
[0000003C - 0000003D] Programmable interrupt controller
[00000040 - 00000043] System timer
[00000044 - 0000005F] Motherboard resources
[0000004E - 0000004F] Motherboard resources
[00000050 - 00000053] System timer
[00000061 - 00000061] Motherboard resources
[00000062 - 00000063] Motherboard resources
[00000063 - 00000063] Motherboard resources
[00000065 - 00000065] Motherboard resources
[00000065 - 0000006F] Motherboard resources
[00000067 - 00000067] Motherboard resources
[00000070 - 00000070] Motherboard resources
[00000070 - 00000077] System CMOS/real time clock
[00000072 - 0000007F] Motherboard resources
[00000080 - 00000080] Motherboard resources
[00000080 - 00000080] Motherboard resources
[00000081 - 00000091] Direct memory access controller
[00000084 - 00000086] Motherboard resources
[00000088 - 00000088] Motherboard resources
[0000008C - 0000008E] Motherboard resources
[00000090 - 0000009F] Motherboard resources
[00000092 - 00000092] Motherboard resources
[00000093 - 0000009F] Direct memory access controller
[000000A0 - 000000A1] Programmable interrupt controller
[000000A2 - 000000BF] Motherboard resources
[000000A4 - 000000A5] Programmable interrupt controller
[000000A8 - 000000A9] Programmable interrupt controller
[000000AC - 000000AD] Programmable interrupt controller
[000000B0 - 000000B1] Programmable interrupt controller
[000000B2 - 000000B3] Motherboard resources
[000000B4 - 000000B5] Programmable interrupt controller
[000000B8 - 000000B9] Programmable interrupt controller
[000000BC - 000000BD] Programmable interrupt controller
[000000C0 - 000000DF] Direct memory access controller
[000000E0 - 000000EF] Motherboard resources
[000000F0 - 000000F0] Numeric data processor
[00000295 - 000002A4] Motherboard resources
[000002F8 - 000002FF] Communications Port (COM2)
[000003B0 - 000003BB] Intel(R) Graphics Media Accelerator 3600 Series
[000003C0 - 000003DF] Intel(R) Graphics Media Accelerator 3600 Series
[000003F8 - 000003FF] Communications Port (COM1)

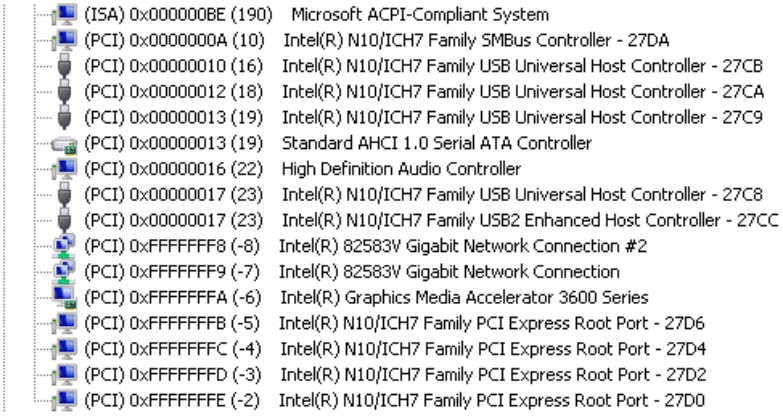

[00000400 - 0000047F] Motherboard resources
[00000400 - 0000047F] Motherboard resources
[000004D0 - 000004D1] Motherboard resources
[000004D0 - 000004D1] Programmable interrupt controller
[00000500 - 0000053F] Motherboard resources
[00000500 - 0000057F] Motherboard resources
[00000600 - 0000061F] Motherboard resources
[00000680 - 0000069F] Motherboard resources
[000006A0 - 000006AF] Motherboard resources
[000006B0 - 000006EF] Motherboard resources
[00000D00 - 0000FFFF] PCI bus
[00001000 - 0000100F] Motherboard resources
[0000D000 - 0000DFFF] Intel(R) N10/ICH7 Family PCI Express Root Port - 27D2
[0000E000 - 0000EFFF] Intel(R) N10/ICH7 Family PCI Express Root Port - 27D0
[0000F000 - 0000F01F] Intel(R) N10/ICH7 Family SMBus Controller - 27DA
[0000F020 - 0000F02F] Standard AHCI 1.0 Serial ATA Controller
[0000F040 - 0000F05F] Intel(R) N10/ICH7 Family USB Universal Host Controller - 27CB
[0000F060 - 0000F07F] Intel(R) N10/ICH7 Family USB Universal Host Controller - 27CA
[0000F080 - 0000F09F] Intel(R) N10/ICH7 Family USB Universal Host Controller - 27C9
[0000F0A0 - 0000F0BF] Intel(R) N10/ICH7 Family USB Universal Host Controller - 27C8
[0000F0C0 - 0000F0C3] Standard AHCI 1.0 Serial ATA Controller
[0000F0D0 - 0000F0D7] Standard AHCI 1.0 Serial ATA Controller
[0000F0E0 - 0000F0E3] Standard AHCI 1.0 Serial ATA Controller
[0000F0F0 - 0000F0F7] Standard AHCI 1.0 Serial ATA Controller
[0000F100 - 0000F107] Intel(R) Graphics Media Accelerator 3600 Series
[0000FFFF - 0000FFFF] Motherboard resources
[0000FFFF - 0000FFFF] Motherboard resources

3.5 Interrupt Controller (IRQ) Map

The interrupt controller (IRQ) mapping list is shown as follows:

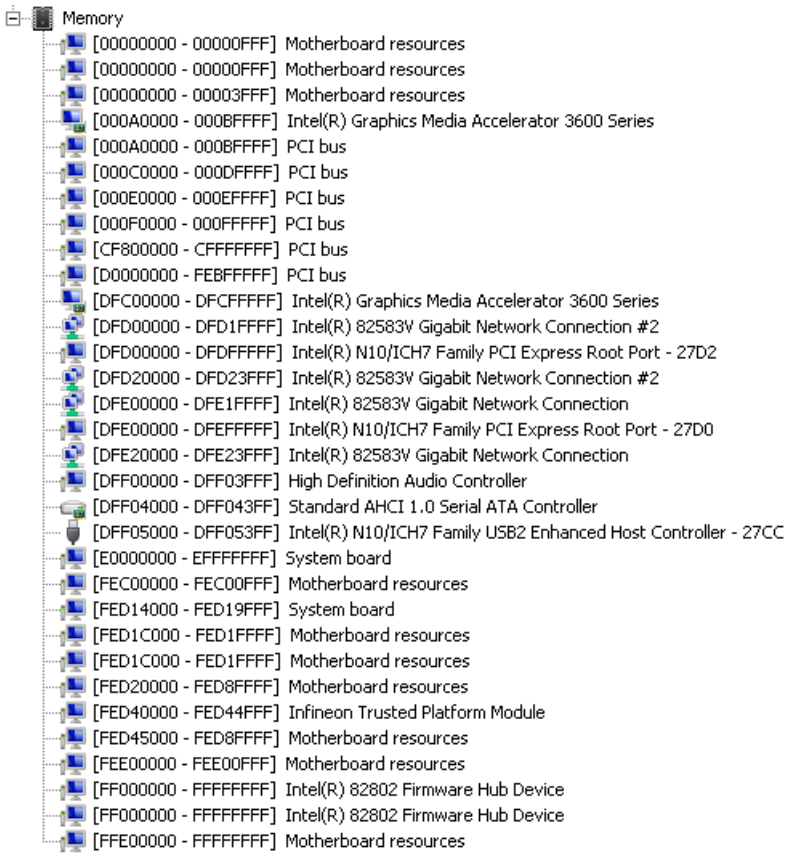



(ISA) 0x00000085 (133) Microsoft ACPI-Compliant System
(ISA) 0x00000086 (134) Microsoft ACPI-Compliant System
(ISA) 0x00000087 (135) Microsoft ACPI-Compliant System
(ISA) 0x00000088 (136) Microsoft ACPI-Compliant System
(ISA) 0x00000089 (137) Microsoft ACPI-Compliant System
(ISA) 0x0000008A (138) Microsoft ACPI-Compliant System
(ISA) 0x0000008B (139) Microsoft ACPI-Compliant System
(ISA) 0x0000008C (140) Microsoft ACPI-Compliant System
(ISA) 0x0000008D (141) Microsoft ACPI-Compliant System
(ISA) 0x0000008E (142) Microsoft ACPI-Compliant System
(ISA) 0x0000008F (143) Microsoft ACPI-Compliant System
(ISA) 0x00000090 (144) Microsoft ACPI-Compliant System
(ISA) 0x00000091 (145) Microsoft ACPI-Compliant System
(ISA) 0x00000092 (146) Microsoft ACPI-Compliant System
(ISA) 0x00000093 (147) Microsoft ACPI-Compliant System
(ISA) 0x00000094 (148) Microsoft ACPI-Compliant System
(ISA) 0x00000095 (149) Microsoft ACPI-Compliant System
(ISA) 0x00000096 (150) Microsoft ACPI-Compliant System
(ISA) 0x00000097 (151) Microsoft ACPI-Compliant System
(ISA) 0x00000098 (152) Microsoft ACPI-Compliant System
(ISA) 0x00000099 (153) Microsoft ACPI-Compliant System
(ISA) 0x0000009A (154) Microsoft ACPI-Compliant System
(ISA) 0x0000009B (155) Microsoft ACPI-Compliant System
(ISA) 0x0000009C (156) Microsoft ACPI-Compliant System
(ISA) 0x0000009D (157) Microsoft ACPI-Compliant System
(ISA) 0x0000009E (158) Microsoft ACPI-Compliant System
(ISA) 0x0000009F (159) Microsoft ACPI-Compliant System
(ISA) 0x000000A0 (160) Microsoft ACPI-Compliant System
(ISA) 0x000000A1 (161) Microsoft ACPI-Compliant System
(ISA) 0x000000A2 (162) Microsoft ACPI-Compliant System
(ISA) 0x000000A3 (163) Microsoft ACPI-Compliant System
(ISA) 0x000000A4 (164) Microsoft ACPI-Compliant System
(ISA) 0x000000A5 (165) Microsoft ACPI-Compliant System
(ISA) 0x000000A6 (166) Microsoft ACPI-Compliant System
(ISA) 0x000000A7 (167) Microsoft ACPI-Compliant System
(ISA) 0x000000A8 (168) Microsoft ACPI-Compliant System
(ISA) 0x000000A9 (169) Microsoft ACPI-Compliant System
(ISA) 0x000000AA (170) Microsoft ACPI-Compliant System
(ISA) 0x000000AB (171) Microsoft ACPI-Compliant System
(ISA) 0x000000AC (172) Microsoft ACPI-Compliant System
(ISA) 0x000000AD (173) Microsoft ACPI-Compliant System
(ISA) 0x000000AE (174) Microsoft ACPI-Compliant System
(ISA) 0x000000AF (175) Microsoft ACPI-Compliant System
(ISA) 0x000000B0 (176) Microsoft ACPI-Compliant System
(ISA) 0x000000B1 (177) Microsoft ACPI-Compliant System
(ISA) 0x000000B2 (178) Microsoft ACPI-Compliant System
(ISA) 0x000000B3 (179) Microsoft ACPI-Compliant System
(ISA) 0x000000B4 (180) Microsoft ACPI-Compliant System
(ISA) 0x000000B5 (181) Microsoft ACPI-Compliant System
(ISA) 0x000000B6 (182) Microsoft ACPI-Compliant System
(ISA) 0x000000B7 (183) Microsoft ACPI-Compliant System
(ISA) 0x000000B8 (184) Microsoft ACPI-Compliant System
(ISA) 0x000000B9 (185) Microsoft ACPI-Compliant System
(ISA) 0x000000BA (186) Microsoft ACPI-Compliant System
(ISA) 0x000000BB (187) Microsoft ACPI-Compliant System
(ISA) 0x000000BC (188) Microsoft ACPI-Compliant System
(ISA) 0x000000BD (189) Microsoft ACPI-Compliant System


(ISA) 0x000000BE (190) Microsoft ACPI-Compliant System
(PCI) 0x0000000A (10) Intel(R) N10/ICH7 Family SMBus Controller - 27DA
(PCI) 0x00000010 (16) Intel(R) N10/ICH7 Family USB Universal Host Controller - 27CB
(PCI) 0x00000012 (18) Intel(R) N10/ICH7 Family USB Universal Host Controller - 27CA
(PCI) 0x00000013 (19) Intel(R) N10/ICH7 Family USB Universal Host Controller - 27C9
(PCI) 0x00000013 (19) Standard AHCI 1.0 Serial ATA Controller
(PCI) 0x00000016 (22) High Definition Audio Controller
(PCI) 0x00000017 (23) Intel(R) N10/ICH7 Family USB Universal Host Controller - 27C8
(PCI) 0x00000017 (23) Intel(R) N10/ICH7 Family USB2 Enhanced Host Controller - 27CC
(PCI) 0xFFFFFFF8 (-8) Intel(R) 82583V Gigabit Network Connection #2
(PCI) 0xFFFFFFF9 (-7) Intel(R) 82583V Gigabit Network Connection
(PCI) 0xFFFFFFFA (-6) Intel(R) Graphics Media Accelerator 3600 Series
(PCI) 0xFFFFFFFB (-5) Intel(R) N10/ICH7 Family PCI Express Root Port - 27D6
(PCI) 0xFFFFFFFC (-4) Intel(R) N10/ICH7 Family PCI Express Root Port - 27D4
(PCI) 0xFFFFFFFD (-3) Intel(R) N10/ICH7 Family PCI Express Root Port - 27D2
(PCI) 0xFFFFFFFE (-2) Intel(R) N10/ICH7 Family PCI Express Root Port - 27D0

3.6 Memory Map

The memory mapping list is shown as follows:


Memory
[00000000 - 00000FFF] Motherboard resources
[00000000 - 00000FFF] Motherboard resources
[00000000 - 00003FFF] Motherboard resources
[000A0000 - 000BFFFF] Intel(R) Graphics Media Accelerator 3600 Series
[000A0000 - 000BFFFF] PCI bus
[000C0000 - 000DFFFF] PCI bus
[000E0000 - 000EFFFF] PCI bus
[000F0000 - 000FFFFF] PCI bus
[CF800000 - CFFFFFFF] PCI bus
[D0000000 - FEBFFFFF] PCI bus
[DFC00000 - DFCFFFFF] Intel(R) Graphics Media Accelerator 3600 Series
[DFD00000 - DFD1FFFF] Intel(R) 82583V Gigabit Network Connection #2
[DFD00000 - DFDFFFFF] Intel(R) N10/ICH7 Family PCI Express Root Port - 27D2
[DFD20000 - DFD23FFF] Intel(R) 82583V Gigabit Network Connection #2
[DFE00000 - DFE1FFFF] Intel(R) 82583V Gigabit Network Connection
[DFE00000 - DFEFFFFF] Intel(R) N10/ICH7 Family PCI Express Root Port - 27D0
[DFE20000 - DFE23FFF] Intel(R) 82583V Gigabit Network Connection
[DFF00000 - DFF03FFF] High Definition Audio Controller
[DFF04000 - DFF043FF] Standard AHCI 1.0 Serial ATA Controller
[DFF05000 - DFF053FF] Intel(R) N10/ICH7 Family USB2 Enhanced Host Controller - 27CC
[E0000000 - EFFFFFFF] System board
[FEC00000 - FEC00FFF] Motherboard resources
[FED14000 - FED19FFF] System board
[FED1C000 - FED1FFFF] Motherboard resources
[FED1C000 - FED1FFFF] Motherboard resources
[FED20000 - FED8FFFF] Motherboard resources
[FED40000 - FED44FFF] Infineon Trusted Platform Module
[FED45000 - FED8FFFF] Motherboard resources
[FEE00000 - FEE00FFF] Motherboard resources
[FF000000 - FFFFFFFF] Intel(R) 82802 Firmware Hub Device
[FF000000 - FFFFFFFF] Intel(R) 82802 Firmware Hub Device
[FFE00000 - FFFFFFFF] Motherboard resources

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Chapter 4
AMI BIOS Setup Utility

The AMI UEFI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a flash chip to save the setup information whenever the power is turned off. This chapter provides users with detailed description about how to set up basic system configuration through the AMI BIOS setup utility.

4.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. After you press the <Del> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menus.

Note: ***If your computer can not boot after making and saving system changes with Setup, you can restore BIOS optimal defaults by setting JP3 (see section 2.3.3).***

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

4.2 Navigation Keys

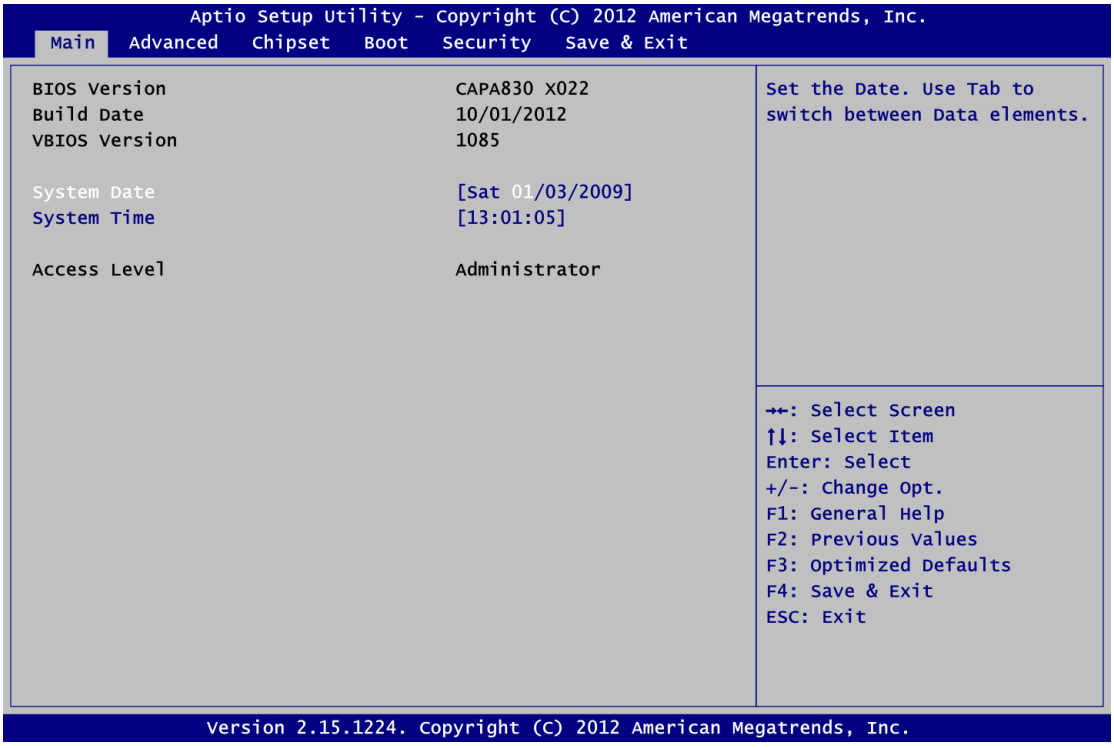
The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.

Note: ***Some of the navigation keys differ from one screen to another.***

Hot Keys	Description
→← Left/Right	The Left and Right <Arrow> keys allow you to select a setup screen.
↑↓ Up/Down	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
Tab	The <Tab> key allows you to select setup fields.
F1	The <F1> key allows you to display the General Help screen.
F2	The <F2> key allows you to Load Previous Values.
F3	The <F3> key allows you to Load Optimized Defaults.
F4	The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes.
Esc	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.

4.3 Main Menu

When you first enter the setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.



- **System Date/Time**
  Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

4.4 Advanced Menu

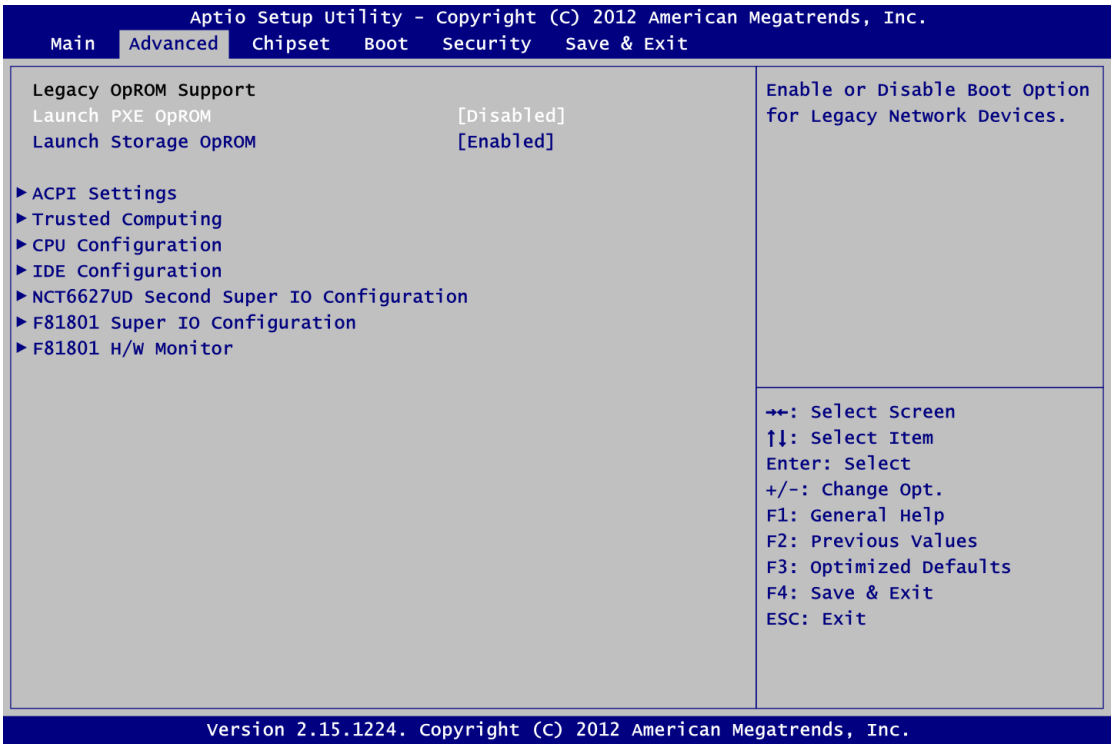
- **Launch PXE OpROM**
  Use this item to enable or disable the boot ROM function of the onboard LAN chip when the system boots up.

- **Launch Storage OpROM**
  Enable or disable boot option for legacy mass storage devices with option ROM.

The Advanced menu also allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

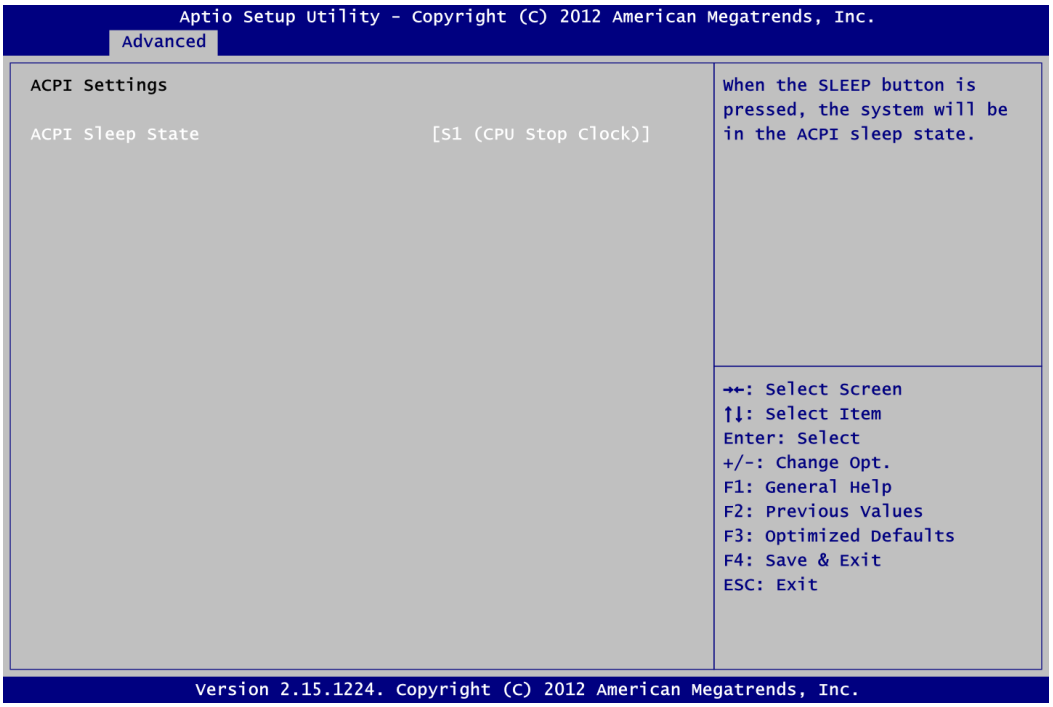
- ► ACPI Settings
- ► Trusted Computing
- ► CPU Configuration
- ► IDE Configuration
- ► NCT6627UD Second Super IO Configuration
- ► F81801 Super IO Configuration
- ► F81801 H/W Monitor

For items marked with "►", please press <Enter> for more options.



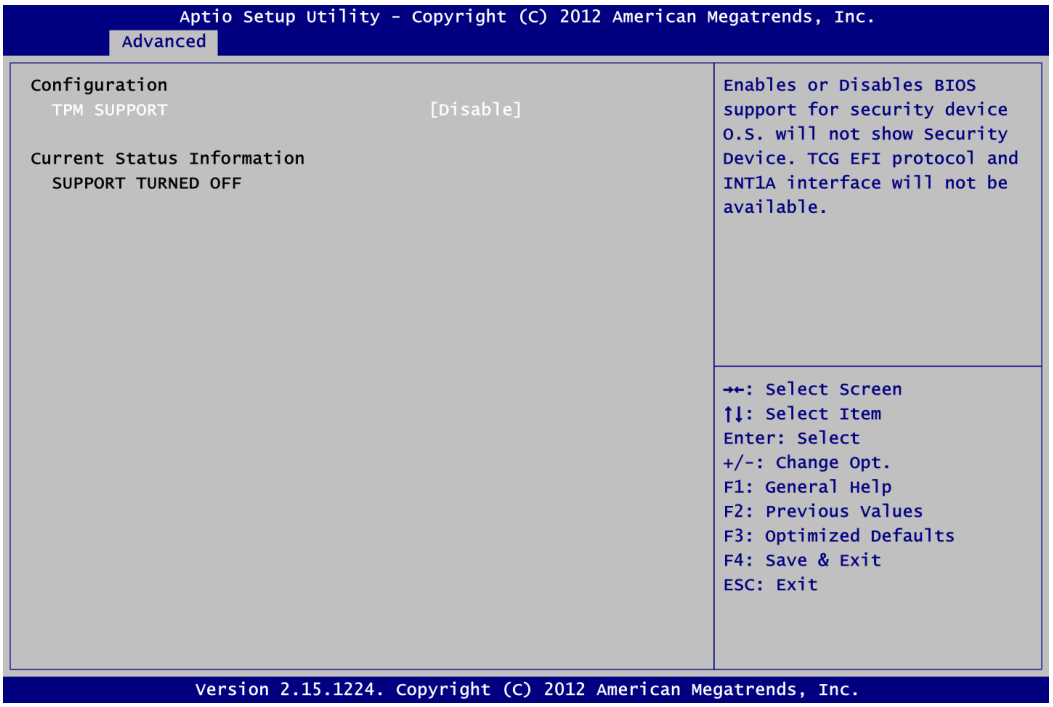
Note: ***"NCT6627UD Second Super IO Configuration" is showed only when ZIO module AX93262 is installed.***

- **ACPI Settings**


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
ACPI Settings
ACPI Sleep State
[S1 (CPU Stop Clock)]
When the SLEEP button is pressed, the system will be in the ACPI sleep state.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1224. Copyright (C) 2012 American Megatrends, Inc.

ACPI Sleep State
When the sleep button is pressed, the system will be in the ACPI sleep state. The default is S1 (CPU Stop Clock).

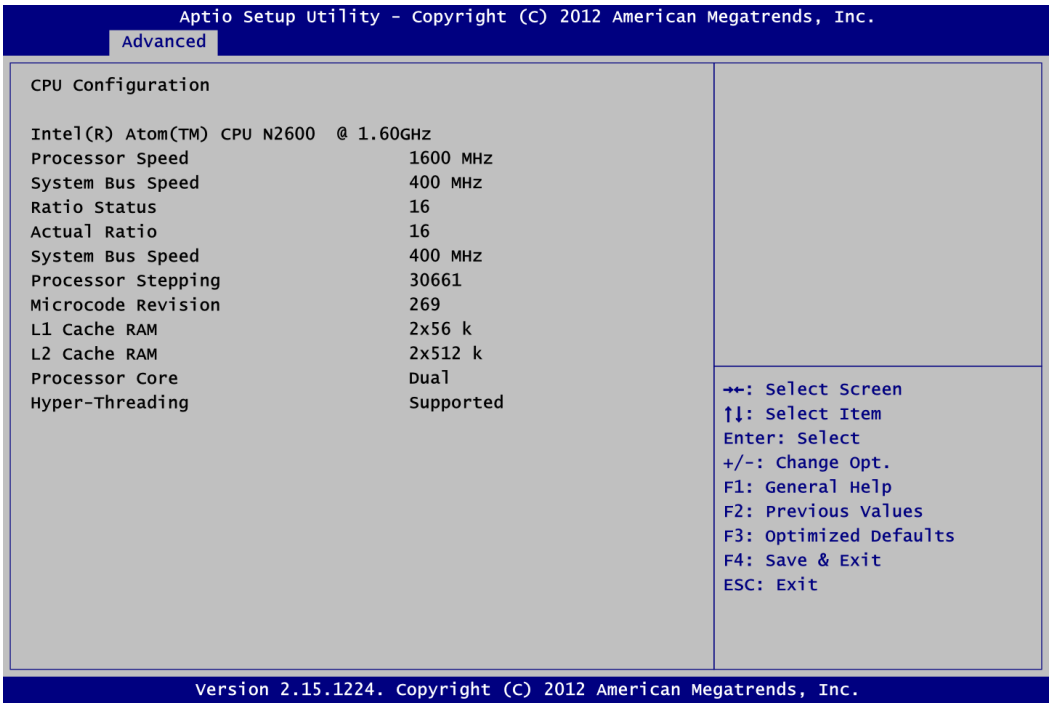
- **Trusted Computing**
  This screen provides function for specifying the TPM settings.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
Configuration
TPM SUPPORT [Disable]
Current Status Information
SUPPORT TURNED OFF
Enables or Disables BIOS support for security device O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1224. Copyright (C) 2012 American Megatrends, Inc.

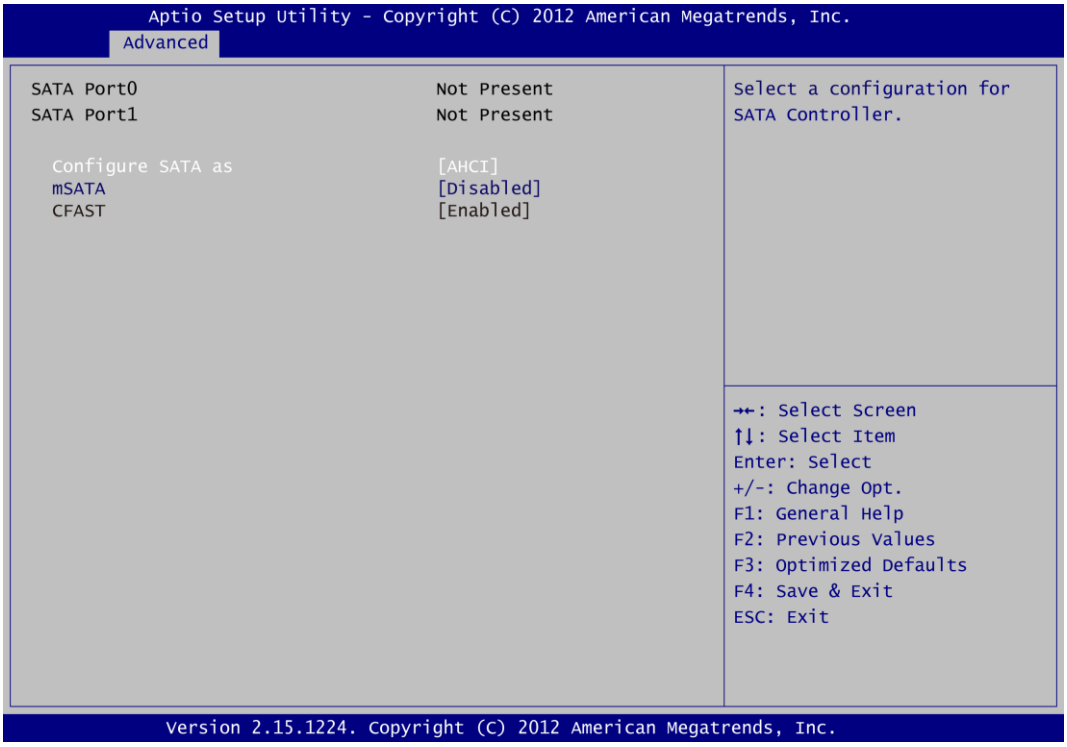
TPM Support
Enable or disable BIOS support for security device. "Disable" is the default.

Current Status Information
Display current TPM status information.

- **CPU Configuration**
  This screen shows the CPU Configuration.



- **IDE Configuration**
  In the IDE Configuration menu, you can see the currently installed hardware in the SATA ports. During system boot up, the BIOS automatically detects the presence of SATA devices.

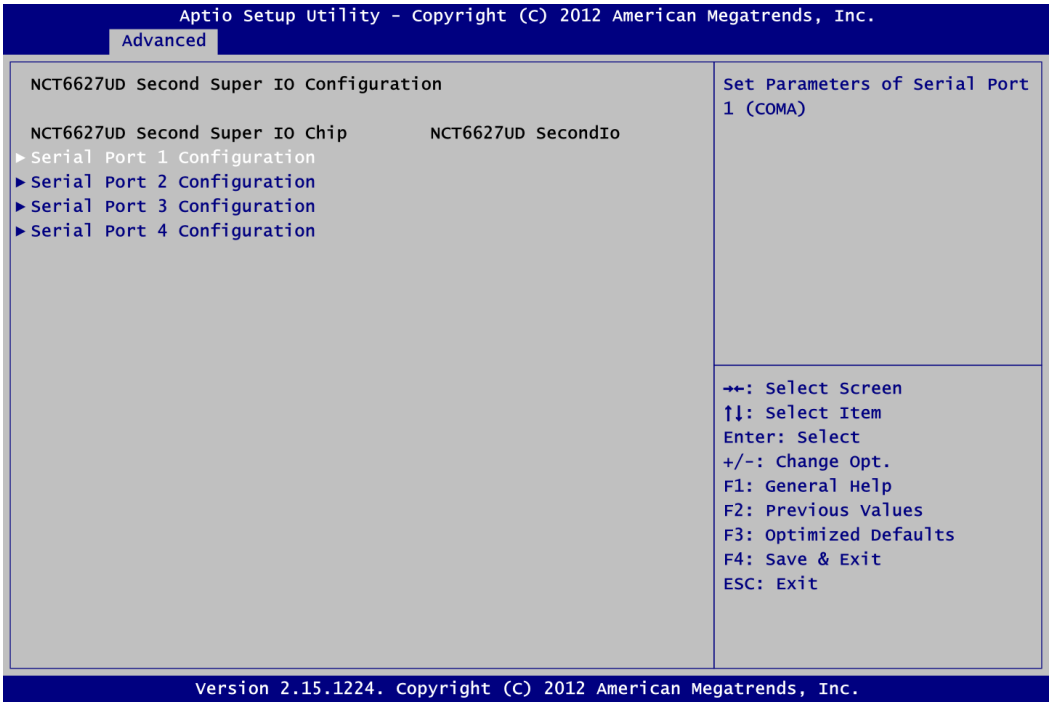


Configure SATA as
Determine how SATA controller(s) operate. Operation mode options are IDE Mode and AHCI (Advanced Host Controller Interface) Mode.

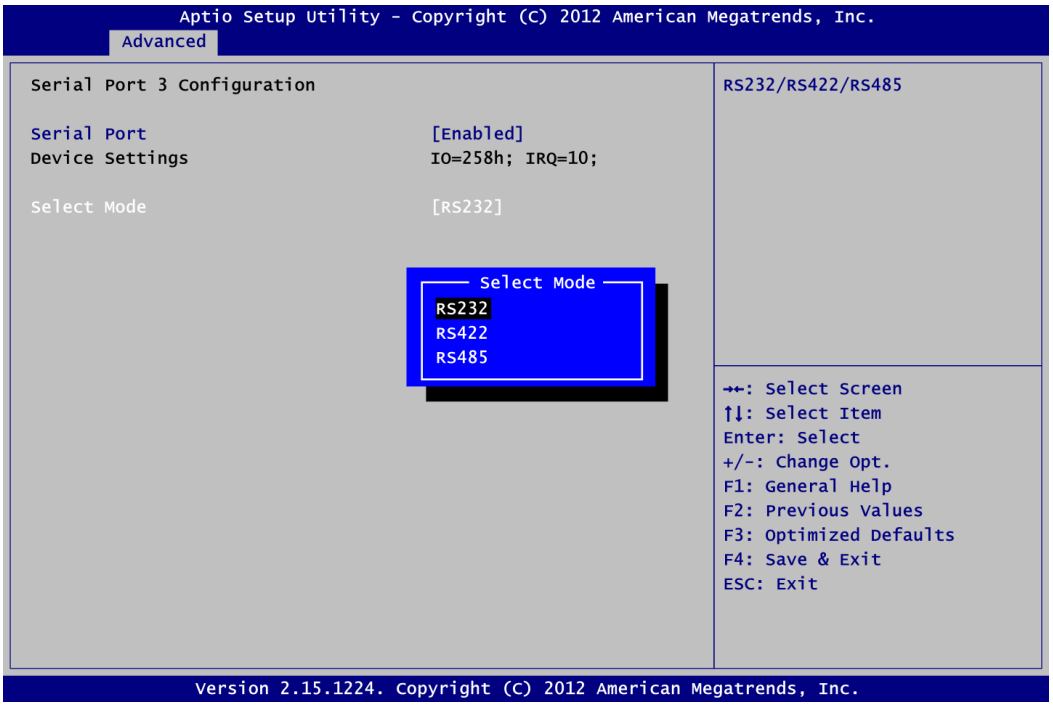
mSATA
It is to enable mSATA when the mSATA cards are installed in SCN1 (see section 2.4.19). Default setting is Disabled.

CFAST
Default setting is Enabled. Once mSATA is enabled, it will be set Disabled automatically.

- **NCT6627UD Second Super IO Configuration**
  When ZIO module AX93262 is installed, you can use this screen to set the serial ports configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "▶", please press <Enter> for more options.

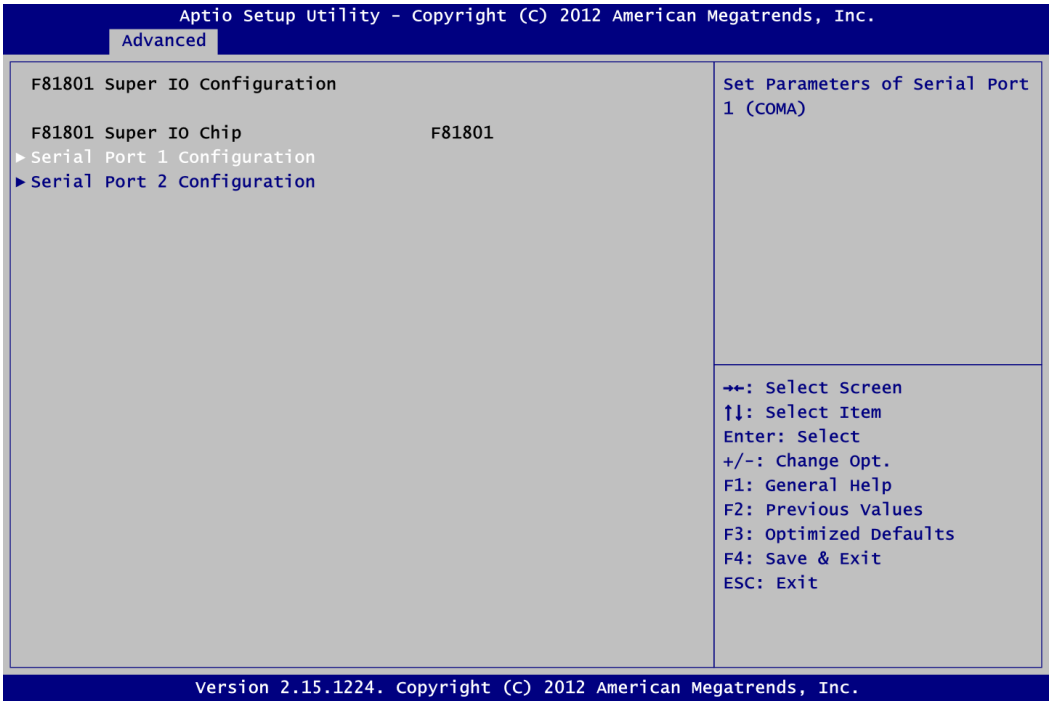

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
NCT6627UD Second Super IO Configuration
NCT6627UD Second Super IO Chip NCT6627UD SecondIo
▶ Serial Port 1 Configuration
▶ Serial Port 2 Configuration
▶ Serial Port 3 Configuration
▶ Serial Port 4 Configuration
Set Parameters of Serial Port 1 (COMA)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1224. Copyright (C) 2012 American Megatrends, Inc.

Serial Port 1~2 Configuration
Use these items to enable or disable the serial port 1~2.

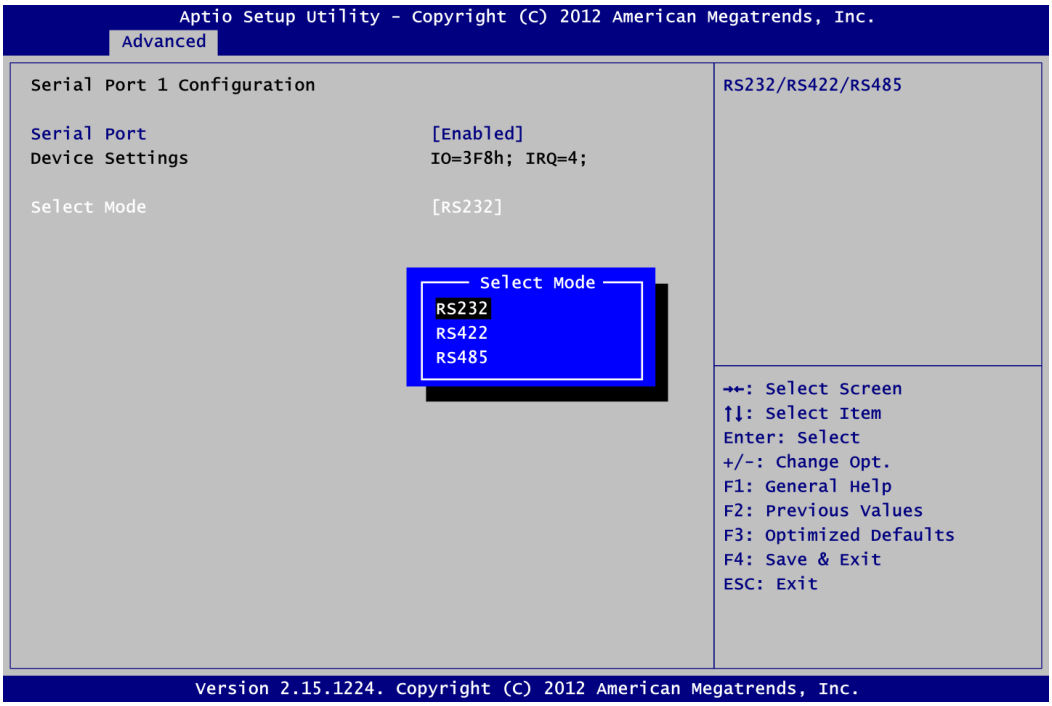


Serial Port 3~4 Configuration
Use these items to enable or disable and set RS-422/RS-485 mode for the serial port 3~4.

- **F81801 Super IO Configuration**
  You can use this screen to select options for the Super IO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "▶", please press <Enter> for more options.

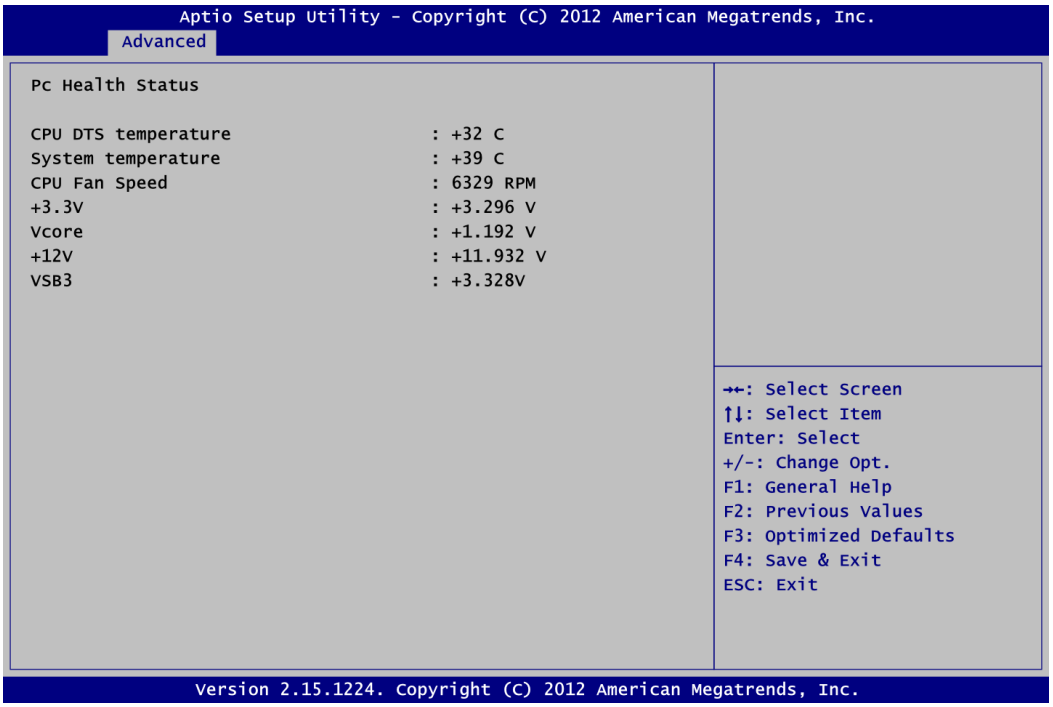

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
F81801 Super IO Configuration
F81801 Super IO Chip F81801
▶ Serial Port 1 Configuration
▶ Serial Port 2 Configuration
Set Parameters of Serial Port 1 (COMA)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1224. Copyright (C) 2012 American Megatrends, Inc.

Serial Port 2 Configuration
Use this item to enable or disable the serial port 2.



Serial Port 1 Configuration
Use this item to enable or disable and set RS-422/RS-485 mode for the serial port 1.

- **F81801 H/W Monitor**
  This screen monitors hardware health status.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
Pc Health Status
CPU DTS temperature : +32 C
System temperature : +39 C
CPU Fan Speed : 6329 RPM
+3.3V : +3.296 V
Vcore : +1.192 V
+12V : +11.932 V
VSB3 : +3.328V
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1224. Copyright (C) 2012 American Megatrends, Inc.

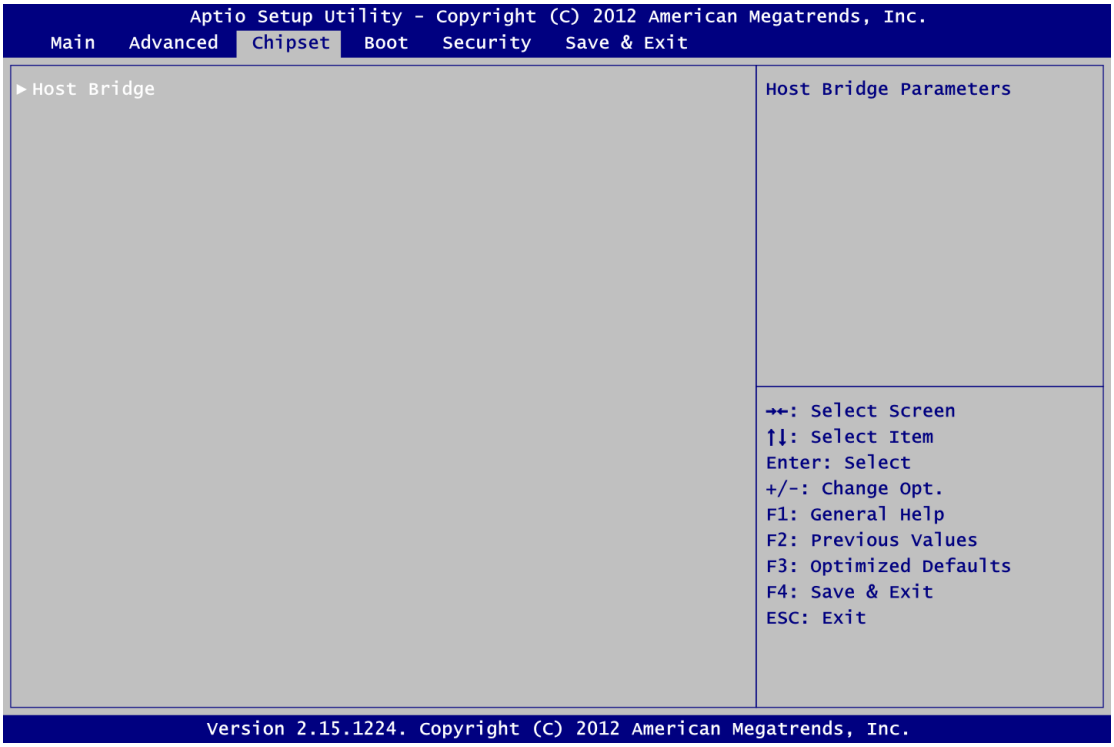
This screen displays the temperature of system and CPU, CPU fan speed in RPM and system voltages (+3.3V, Vcore, +12V and VSB3).

4.5 Chipset Menu

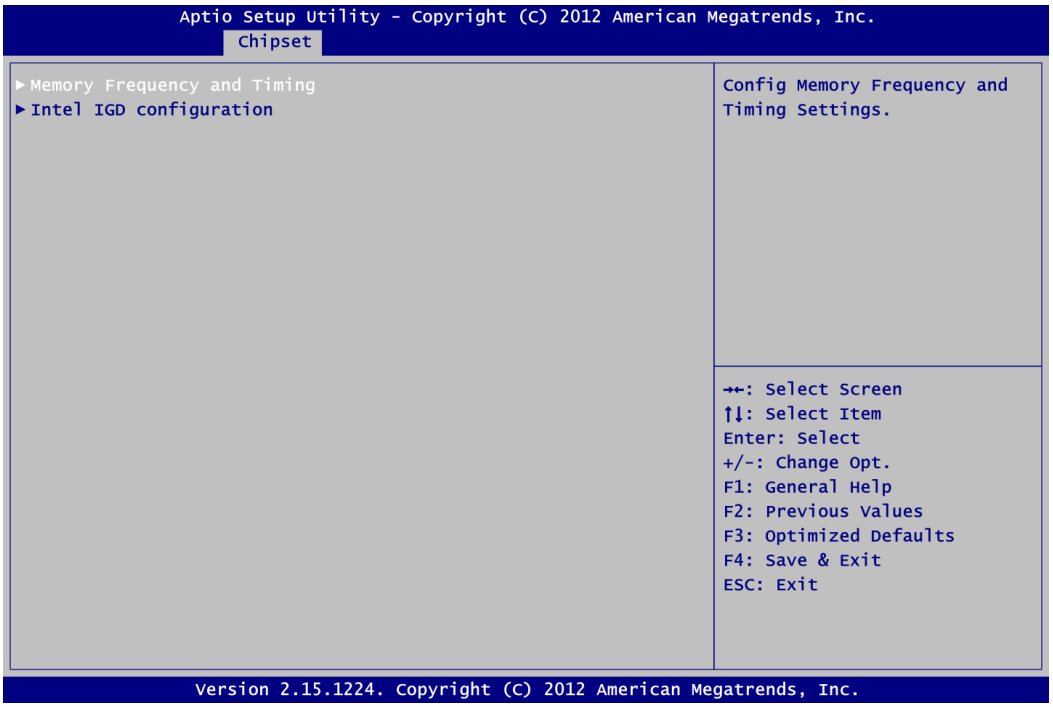
The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

- ► Host Bridge

For items marked with "►", please press <Enter> for more options.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
►Host Bridge
Host Bridge Parameters
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1224. Copyright (C) 2012 American Megatrends, Inc.

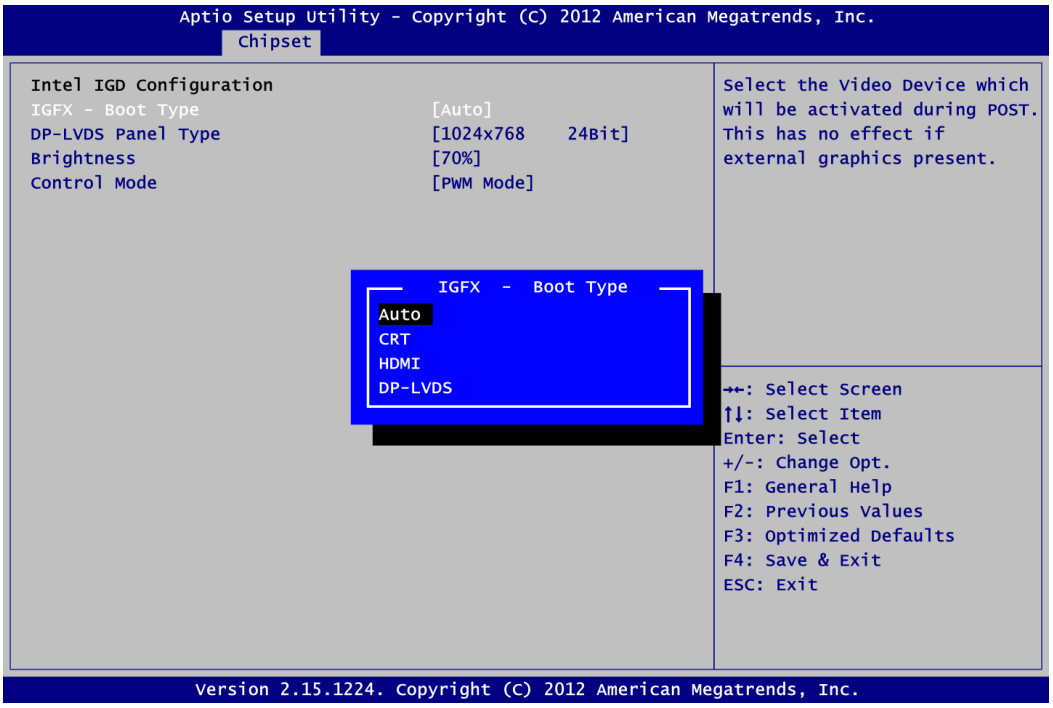
- **Host Bridge**
  This screen allows users to configure parameters of Host Bridge chipset.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Chipset
▶ Memory Frequency and Timing
▶ Intel IGD configuration
Config Memory Frequency and Timing Settings.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1224. Copyright (C) 2012 American Megatrends, Inc.

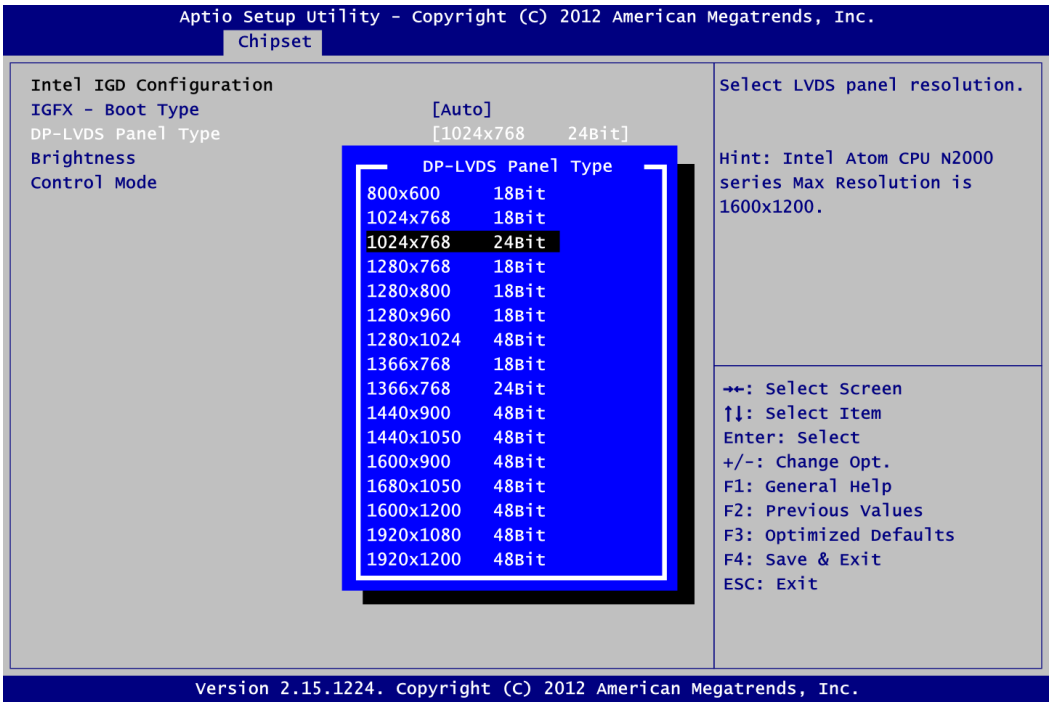
Memory Frequency and Timing
Use this item to refer to the information related to memory frequency.

Intel IGD Configuration
Use this item to configure internal graphics controller.

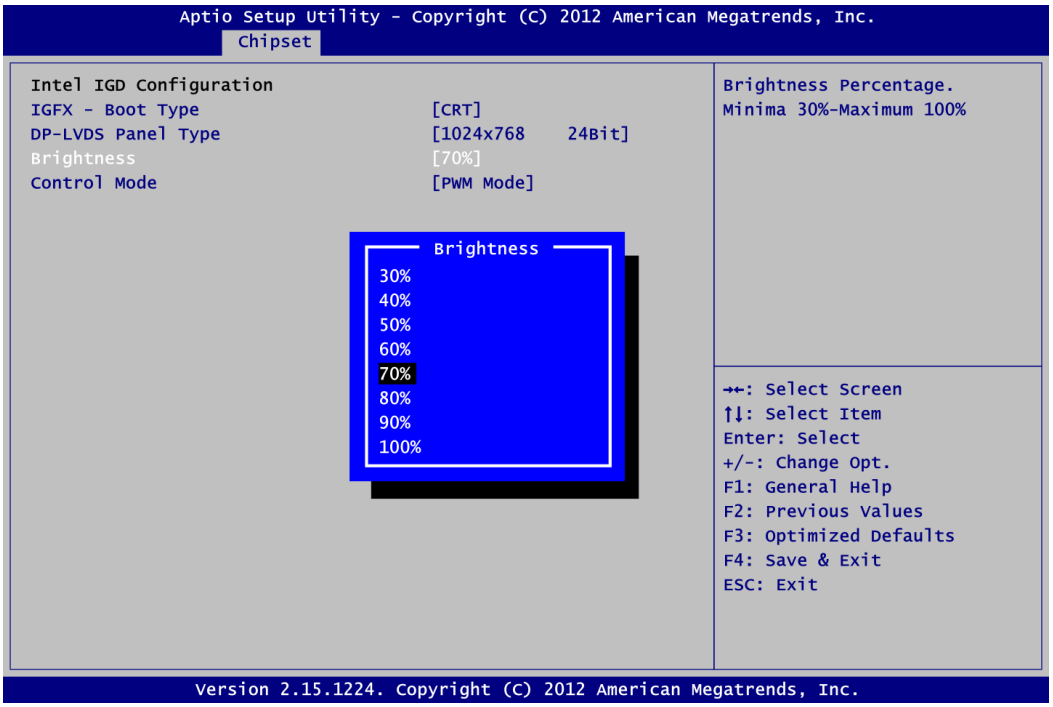
- **Intel IGD Configuration**



IGFX – Boot Type
Select the video device which will be activated during POST (Power-On Self Test). This has no effect if external graphics present.

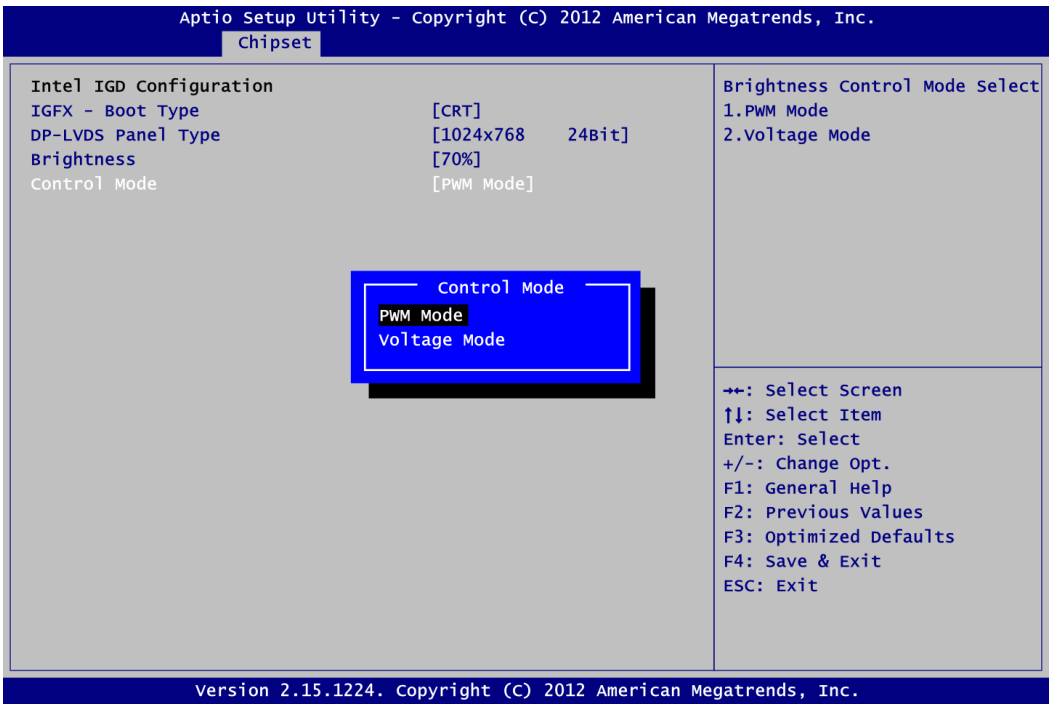


DP-LVDS Panel Type
Select LVDS panel resolution.



Brightness

Use this item to select the brightness percentage of LVDS panel. Its range is from 30% to 100%. The default is 70%.

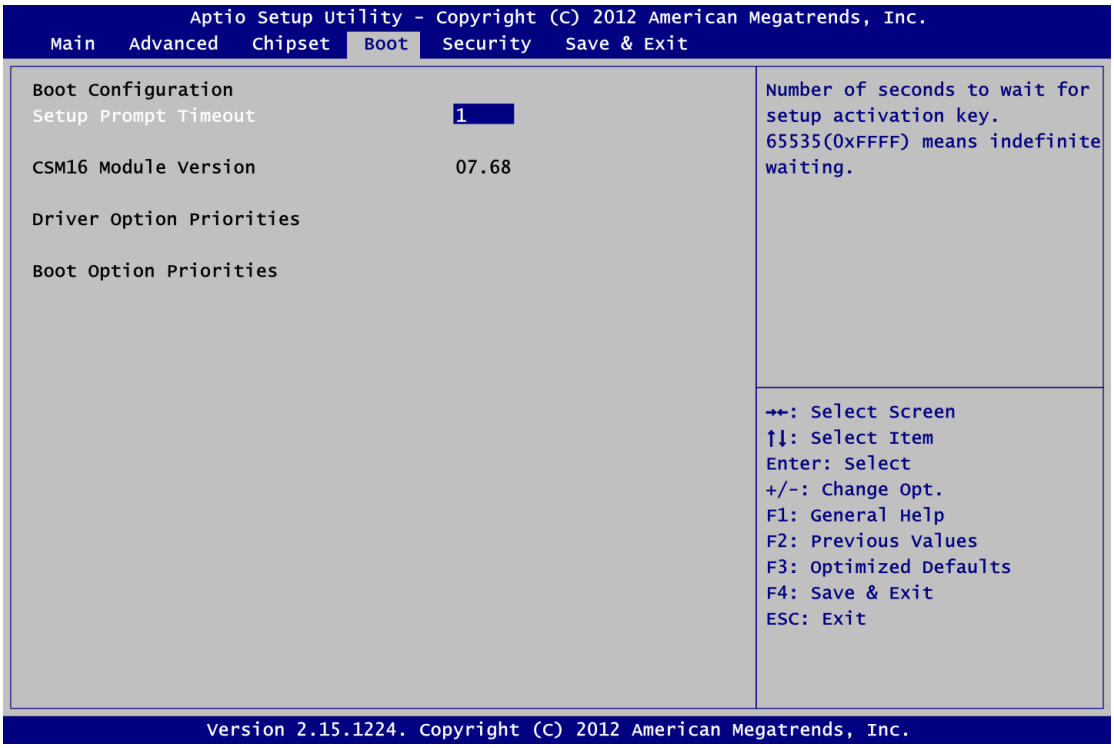


Control Mode

Use this item for brightness control mode selection. The default is PWM Mode.

4.6 Boot Menu

The Boot menu allows users to change boot options of the system.

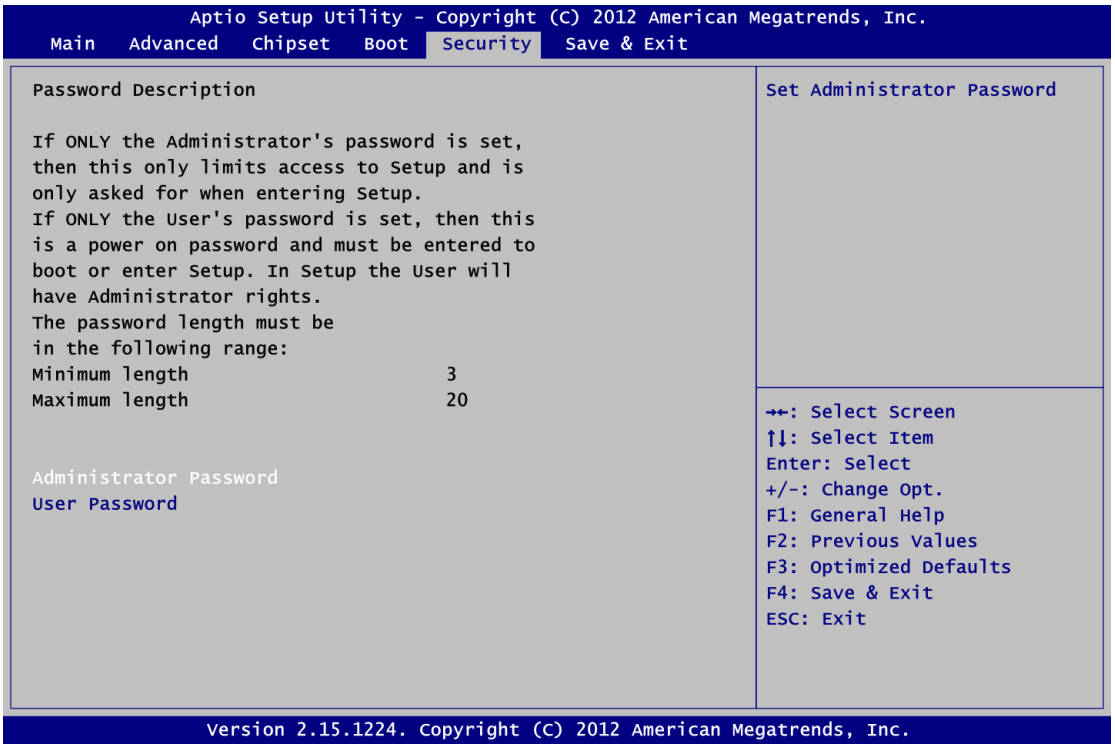

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Boot Configuration
Setup Prompt Timeout
1
CSM16 Module Version
07.68
Driver Option Priorities
Boot Option Priorities
Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1224. Copyright (C) 2012 American Megatrends, Inc.

- **Setup Prompt Timeout**
  Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

- **Boot Option Priorities**
  These are settings for boot priority. Specify the boot device priority sequence from the available devices.

4.7 Security Menu

The Security menu allows users to change the security settings for the system.

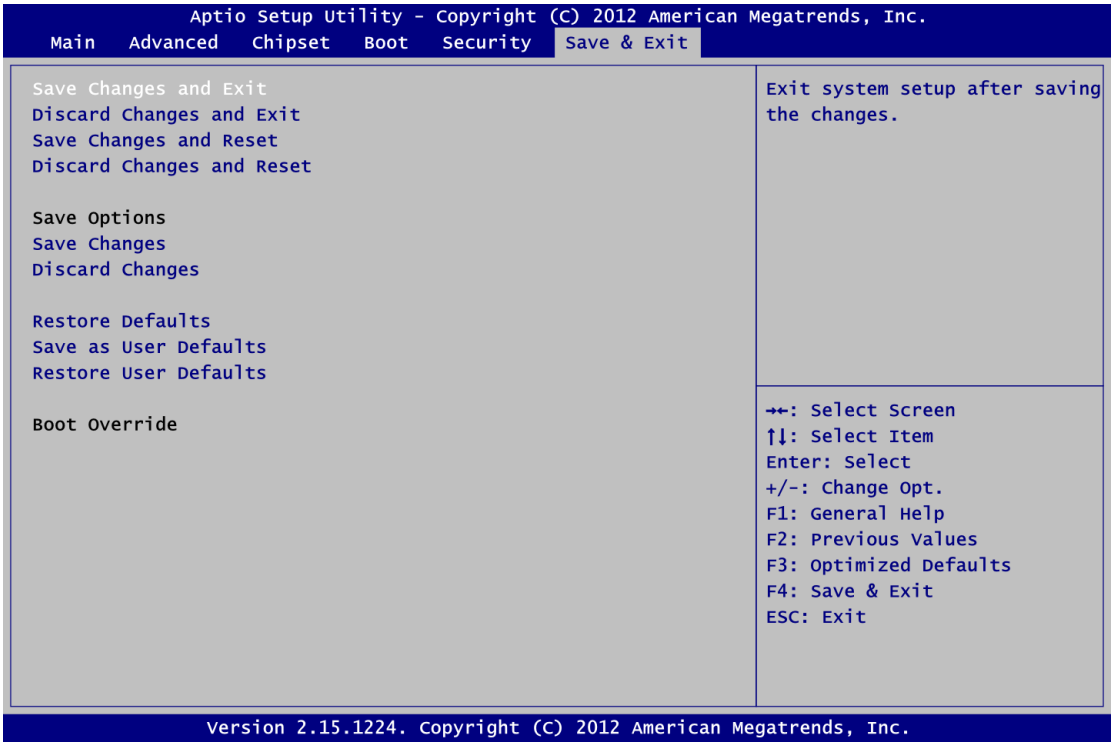

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password length must be in the following range:
Minimum length 3
Maximum length 20
Administrator Password
User Password
Set Administrator Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1224. Copyright (C) 2012 American Megatrends, Inc.

- **Administrator Password**
  This item indicates whether an administrator password has been set (installed or uninstalled).

- **User Password**
  This item indicates whether an user password has been set (installed or uninstalled).

4.8 Save & Exit Menu

The Save & Exit menu allows users to load your system configuration with optimal or fail-safe default values.



- **Save Changes and Exit**
  When you have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.

- **Discard Changes and Exit**
  Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.

- **Save Changes and Reset**
  When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.

- **Discard Changes and Reset**
  Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.

- **Save Changes**
  When you have completed the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

- **Discard Changes**
  Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.

- **Restore Defaults**
  It automatically sets all Setup options to a complete set of default settings when you select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.

- **Save as User Defaults**
  Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.

- **Restore User Defaults**
  It automatically sets all Setup options to a complete set of User Defaults when you select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.

- **Boot Override**
  Select a drive to immediately boot that device regardless of the current boot order.

Chapter 5
Drivers Installation

The device drivers are located on the product information CD that comes with the CAPA830 Series package. The auto-run function of drivers will guide you to install the utilities and device drivers under Windows system. You can follow the onscreen instructions to install these devices:

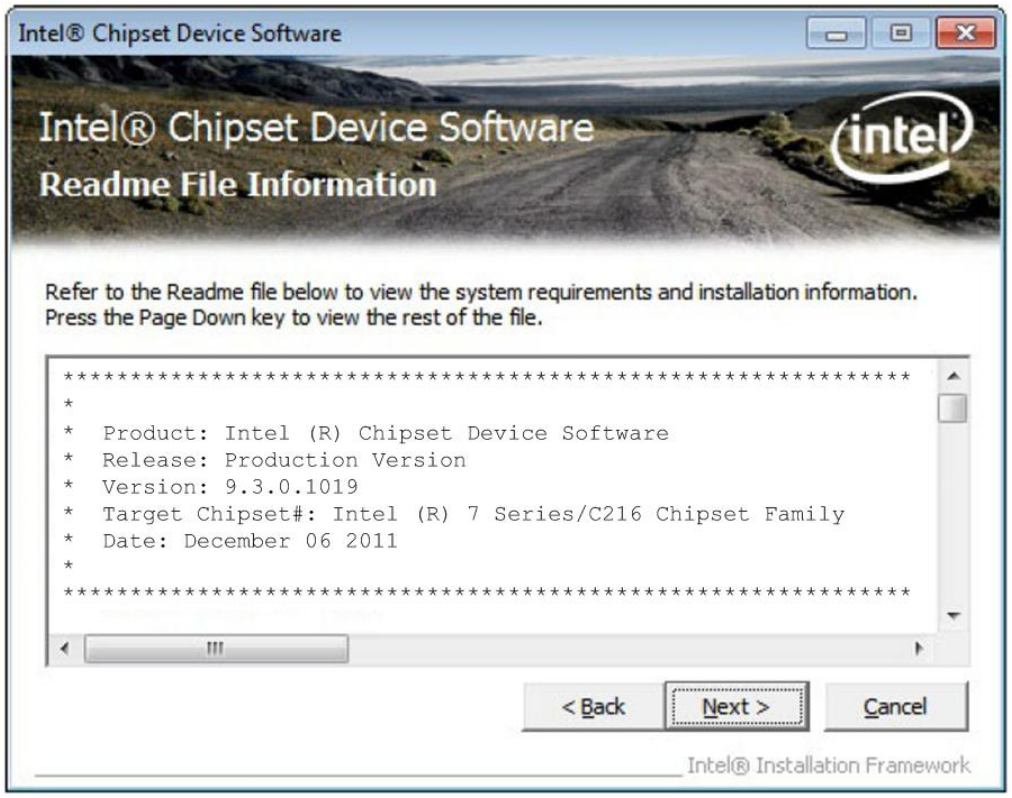
- Chipset
- Graphics
- Ethernet
- Audio

5.1 Installing Chipset Driver

1. Run the infinst_autol.exe program from the driver directory in product information CD. Click "Next" to next step.

Intel® Chipset Device Software
Intel® Chipset Device Software
intel
Welcome to the Setup Program
This setup program will install the Intel® Chipset Device Software onto this computer. It is strongly recommended that you exit all programs before continuing.
< Back
Next >
Cancel
Intel® Installation Framework

2. A Readme File Information screen appears to show you the system requirements and installation information. Click "Next" to next step.


Intel® Chipset Device Software
Intel® Chipset Device Software
Readme File Information
Refer to the Readme file below to view the system requirements and installation information.
Press the Page Down key to view the rest of the file.
****
* Product: Intel (R) Chipset Device Software
* Release: Production Version
* Version: 9.3.0.1019
* Target Chipset#: Intel (R) 7 Series/C216 Chipset Family
* Date: December 06 2011
*
****
< Back
Next >
Cancel
Intel® Installation Framework

3. Please wait while setup processes the following operations.

Intel® Chipset Device Software
Intel® Chipset Device Software
Setup Progress
Please wait while the following setup operations are performed:
Installing Driver: Intel(R) N10/ICH7 Family USB2 Enhanced Host Controller - 27CC
Version: 9.1.1.1016
Installing Driver: Intel(R) N10/ICH7 Family PCI Express Root Port - 27D4
Version: 9.1.1.1016
Installing Driver: Intel(R) N10/ICH7 Family PCI Express Root Port - 27D6
Version: 9.1.1.1016
Installing Driver: Intel(R) N10/ICH7 Family SMBus Controller - 27DA
Version: 9.1.1.1016
Installing Driver: Intel(R) N10/ICH7 Family PCI Express Root Port - 27D0
Version: 9.1.1.1016
Installing Driver: Intel(R) N10/ICH7 Family PCI Express Root Port - 27D2
Version: 9.1.1.1016
Next
Intel® Installation Framework

4. You are suggested to select "Yes, I want to restart this computer now". Click "Finish" to complete the setup process and reboot.

Intel® Chipset Device Software
Intel® Chipset Device Software
Setup Is Complete
intel
You must restart this computer for the changes to take effect. Would you like to restart the computer now?
Yes, I want to restart this computer now.
No, I will restart this computer later.
Click Finish, then remove any installation media from the drives.
Finish
Intel® Installation Framework

5.2 Installing Graphics Media Accelerator Driver

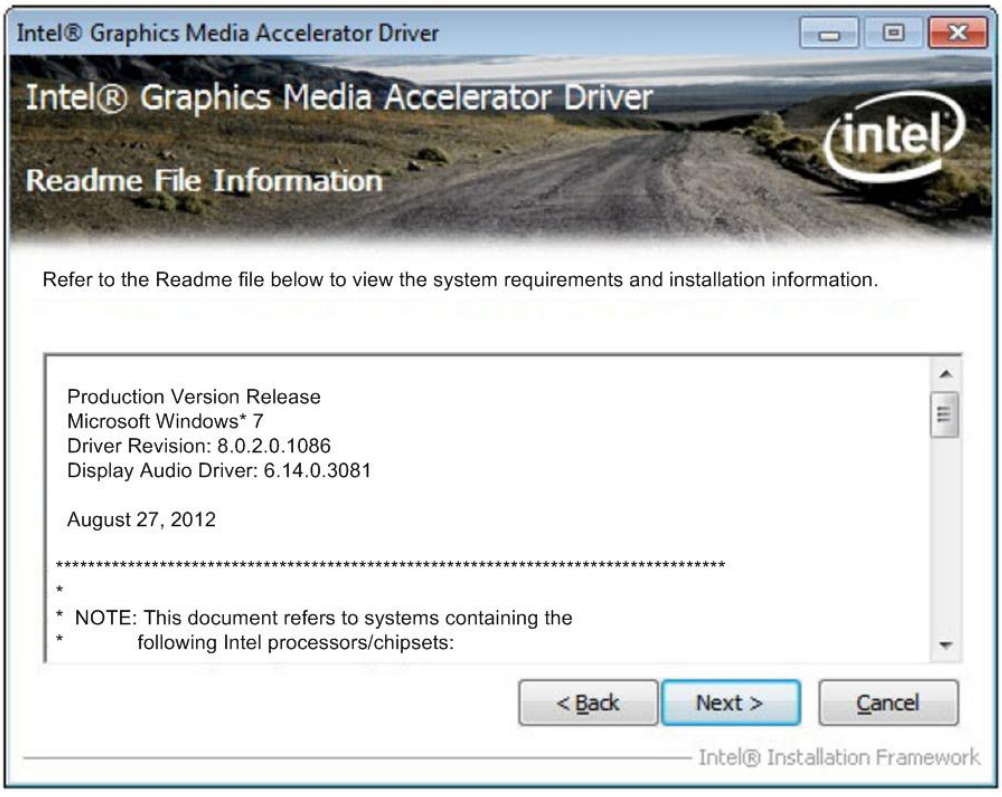
1. Run the setup.exe program from the driver directory in product information CD. Click "Next" to next step.

Intel® Graphics Media Accelerator Driver
Intel® Graphics Media Accelerator Driver
Welcome to the Setup Program
intel
This setup program will install the following components:
- Intel® Graphics Media Accelerator Driver
- Intel® High Definition Audio HDMI Driver
It is strongly recommended that you exit all programs before continuing. Click Next to continue.
Automatically run WinSAT and enable the Windows Aero desktop theme (if supported).
< Back
Next >
Cancel
Intel® Installation Framework

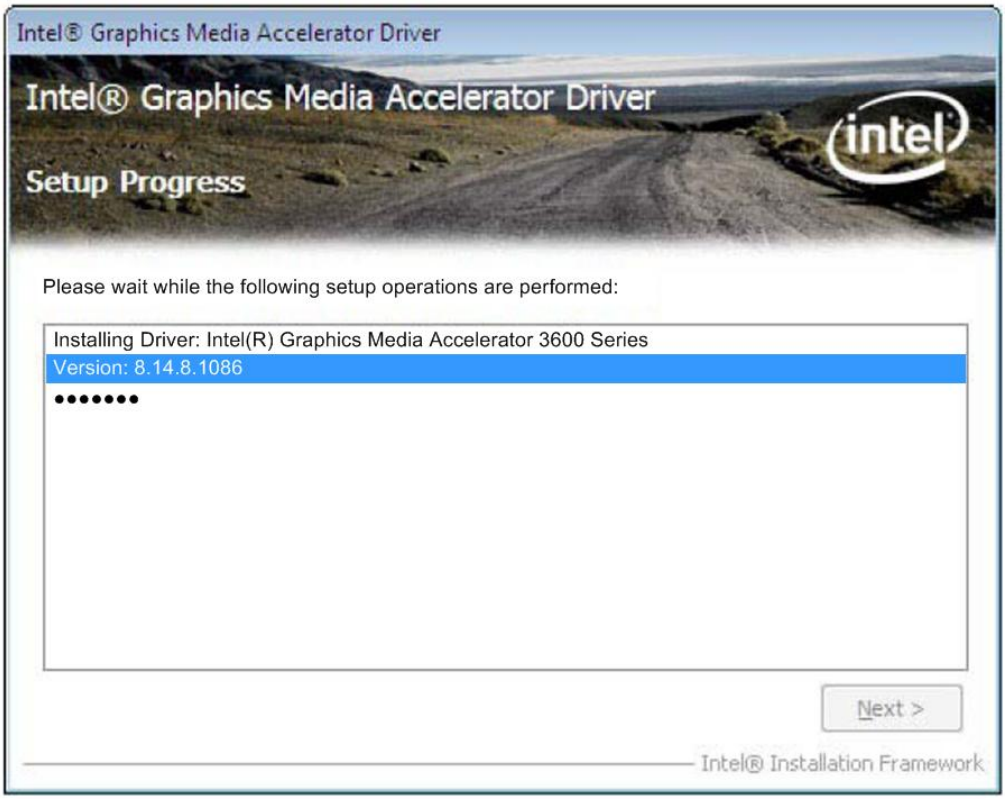
2. When Intel® License Agreement screen appears, please click "Yes" to next step.

Intel® Graphics Media Accelerator Driver
Intel® Graphics Media Accelerator Driver
License Agreement
intel
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load software from this site or any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
• If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV) or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
• If you are an End-User, then only Exhibit A, the INTEL SOFTWARE LICENSE AGREEMENT, applies.
< Back
Yes
No
Intel® Installation Framework

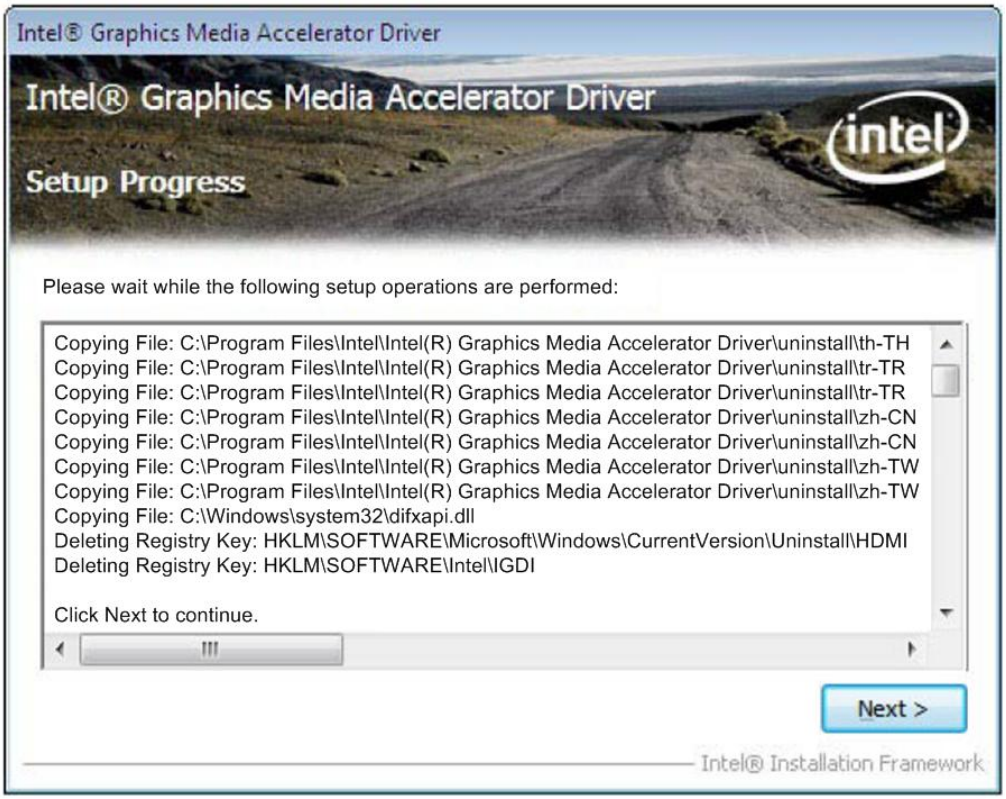
3. A Readme File Information screen appears to show you the system requirements and installation information. Click "Next" to next step.


Intel® Graphics Media Accelerator Driver
Intel® Graphics Media Accelerator Driver
Readme File Information
intel
Refer to the Readme file below to view the system requirements and installation information.
Production Version Release
Microsoft Windows* 7
Driver Revision: 8.0.2.0.1086
Display Audio Driver: 6.14.0.3081
August 27, 2012
****
* NOTE: This document refers to systems containing the
* following Intel processors/chipsets:
< Back
Next >
Cancel
Intel® Installation Framework

4. Please wait while setup processes the following operations.


Intel® Graphics Media Accelerator Driver
Intel® Graphics Media Accelerator Driver
Setup Progress
intel
Please wait while the following setup operations are performed:
Installing Driver: Intel(R) Graphics Media Accelerator 3600 Series
Version: 8.14.8.1086
Next >
Intel® Installation Framework

5. When the following screen appears, please click "Next".


Intel® Graphics Media Accelerator Driver
Intel® Graphics Media Accelerator Driver
Setup Progress
intel
Please wait while the following setup operations are performed:
Copying File: C:\Program Files\Intel\Intel(R) Graphics Media Accelerator Driver\uninstall\th-TH
Copying File: C:\Program Files\Intel\Intel(R) Graphics Media Accelerator Driver\uninstall\tr-TR
Copying File: C:\Program Files\Intel\Intel(R) Graphics Media Accelerator Driver\uninstall\tr-TR
Copying File: C:\Program Files\Intel\Intel(R) Graphics Media Accelerator Driver\uninstall\zh-CN
Copying File: C:\Program Files\Intel\Intel(R) Graphics Media Accelerator Driver\uninstall\zh-CN
Copying File: C:\Program Files\Intel\Intel(R) Graphics Media Accelerator Driver\uninstall\zh-TW
Copying File: C:\Program Files\Intel\Intel(R) Graphics Media Accelerator Driver\uninstall\zh-TW
Copying File: C:\Windows\system32\difxapi.dll
Deleting Registry Key: HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall\HDMI
Deleting Registry Key: HKLM\SOFTWARE\Intel\IGDI
Click Next to continue.
Next >
Intel® Installation Framework

6. You are suggested to select "Yes, I want to restart this computer now". Click "Finish" to complete the setup process and reboot.

Intel® Graphics Media Accelerator Driver
Intel® Graphics Media Accelerator Driver
Setup Is Complete
intel
You must restart this computer for the changes to take effect. Would you like to restart the computer now?
Yes, I want to restart this computer now.
No, I will restart this computer later.
Click Finish, then remove any installation media from the drives.
Finish
Intel® Installation Framework

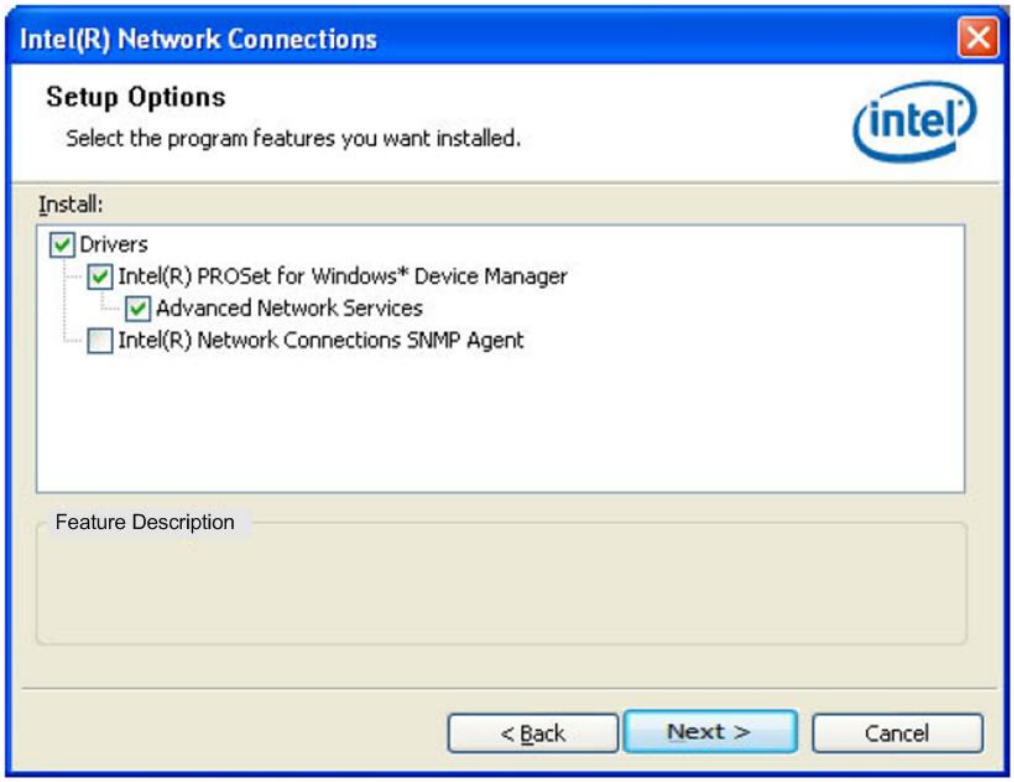
Note: After the computer reboots, the display is in extended mode. Please click hot key <Ctrl+Alt+F1> to switch display back to single mode.

5.3 Installing Ethernet Driver

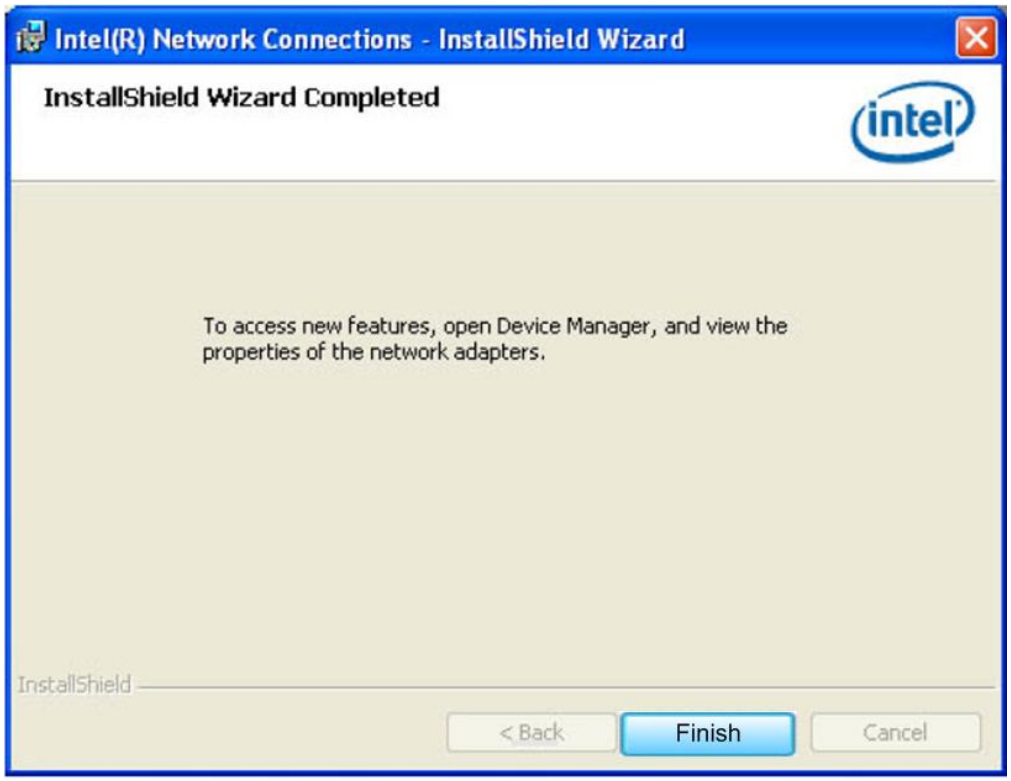
1. Unzip PROWin32 for ethernet driver from the driver directory in product information CD. Click "Next" to start the installation.

Intel(R) Network Connections - InstallShield Wizard
Welcome to the InstallShield Wizard for Intel(R) Network Connections
intel
Install drivers, Intel(R) PROSet for Windows* Device Manager, and Advanced Networking Services.
WARNING: This program is protected by copyright law and International treaties.
InstallShield
< Back
Next >
Cancel

2. When the following screen appears, please select the program features you want to install. Click "Next" to continue.

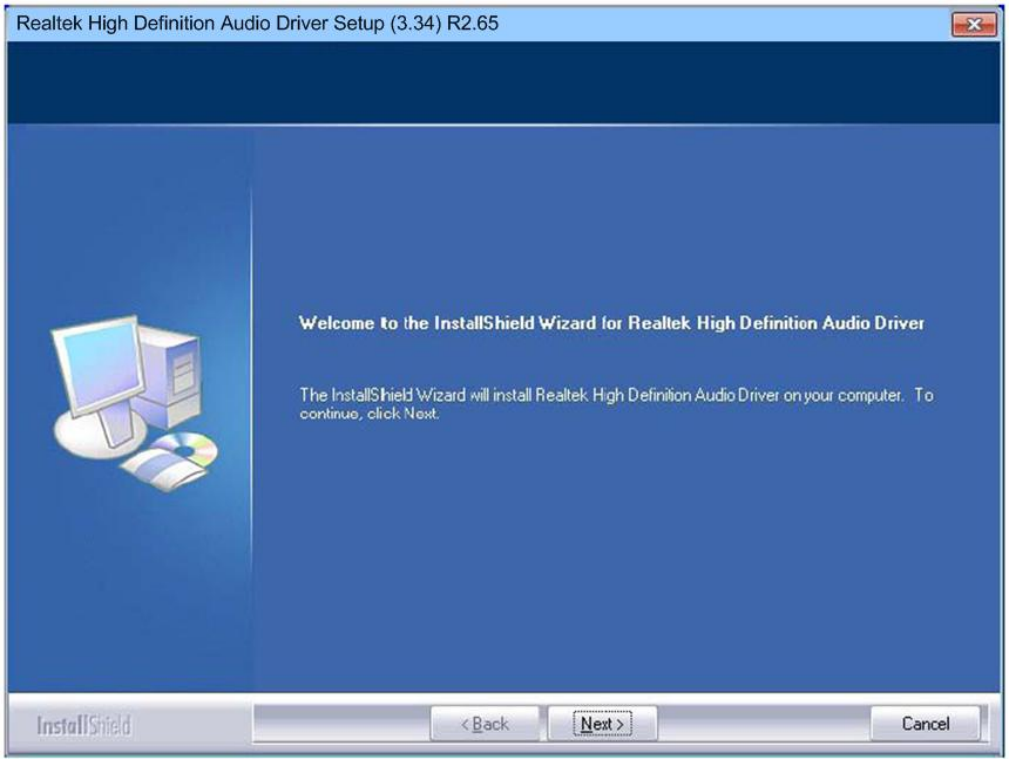


3. Click "Finish" to complete the installation.

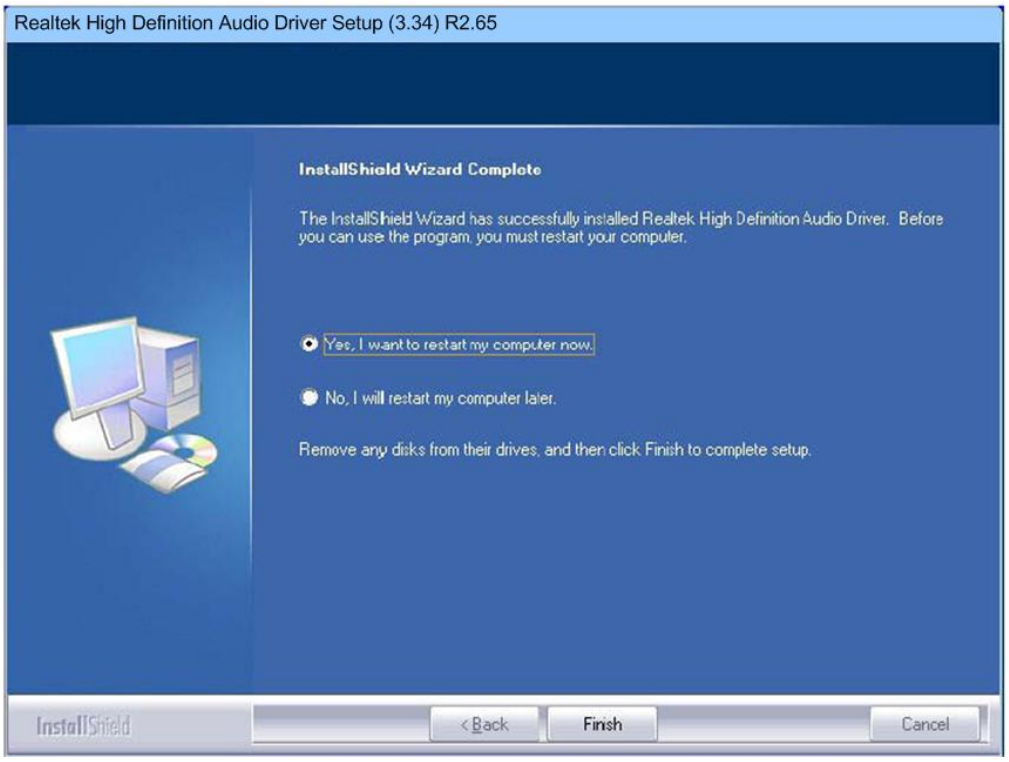

Intel(R) Network Connections - InstallShield Wizard
InstallShield Wizard Completed
To access new features, open Device Manager, and view the properties of the network adapters.
InstallShield
< Back
Finish
Cancel

5.4 Installing Audio Driver

1. Run the setup.exe for audio from the driver directory in product information CD. Click "Next" to continue.


Realtek High Definition Audio Driver Setup (3.34) R2.65
Welcome to the InstallShield Wizard for Realtek High Definition Audio Driver
The InstallShield Wizard will install Realtek High Definition Audio Driver on your computer. To continue, click Next.
InstallShield
< Back
Next >
Cancel

2. You are suggested to select "Yes, I want to restart my computer now". Click "Finish" to complete the setup process and reboot.


Realtek High Definition Audio Driver Setup (3.34) R2.65
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed Realtek High Definition Audio Driver. Before you can use the program, you must restart your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
InstallShield
< Back
Finish
Cancel

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Appendix A
ZIO Module (Optional)

The AX93262 (optional) is a ZIO expansion module. Its specifications and detailed information are given in this appendix.

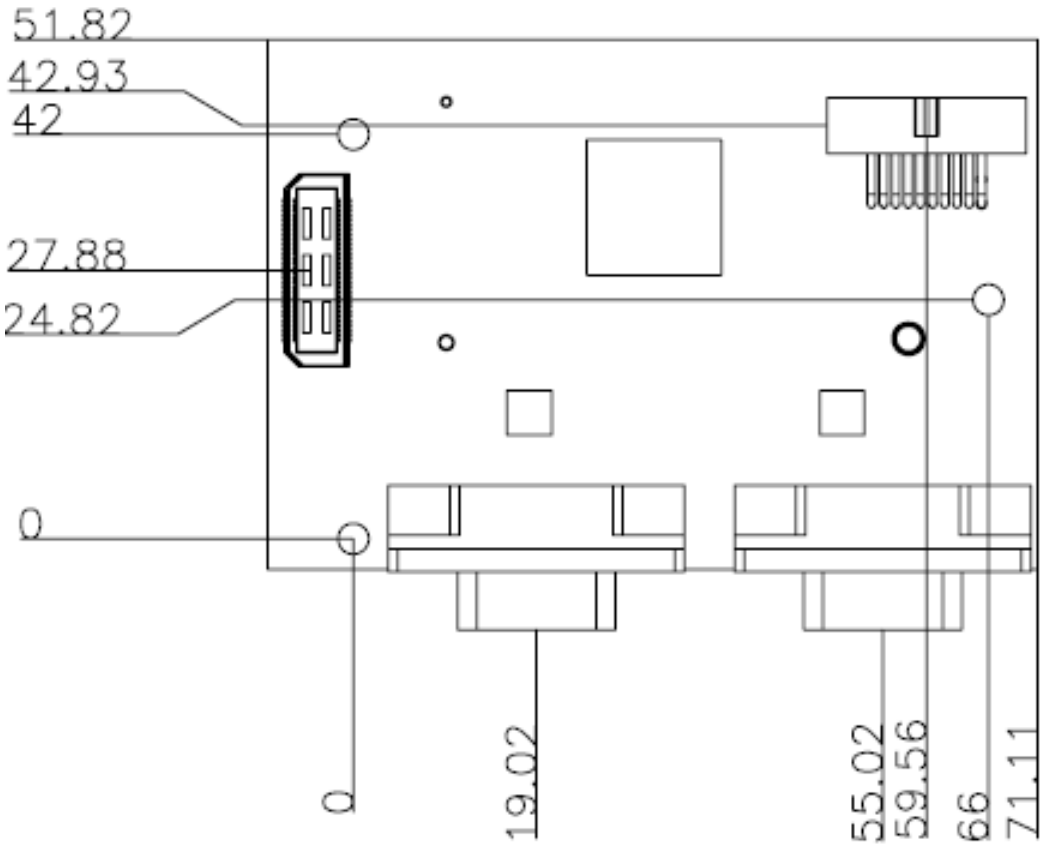
AX93262 Specifications

- **Size**
  - 80mm x 55mm

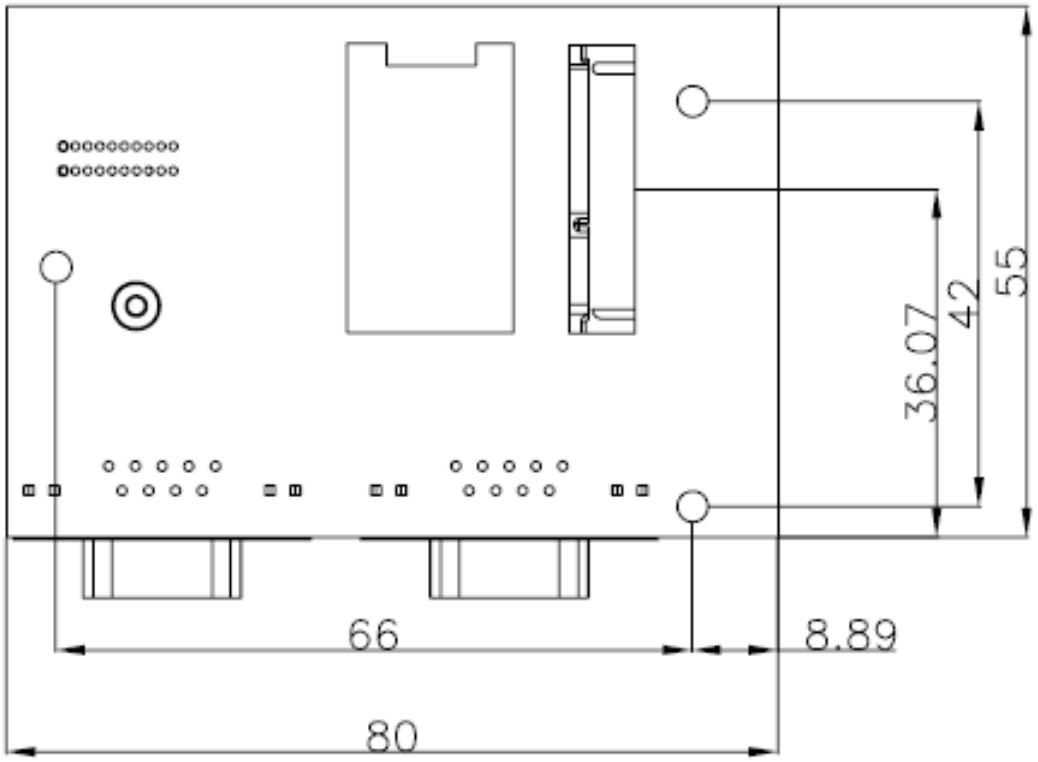
- **Features**
  - One PCI-Express Mini Card socket which complies with PCI-Express Mini Card Spec. V1.2.
  - One SIM socket.
  - Serial Ports: Two ports for RS-232/422/485 and two ports for RS-232.

Note: ***All specifications and images are subject to change without notice.***

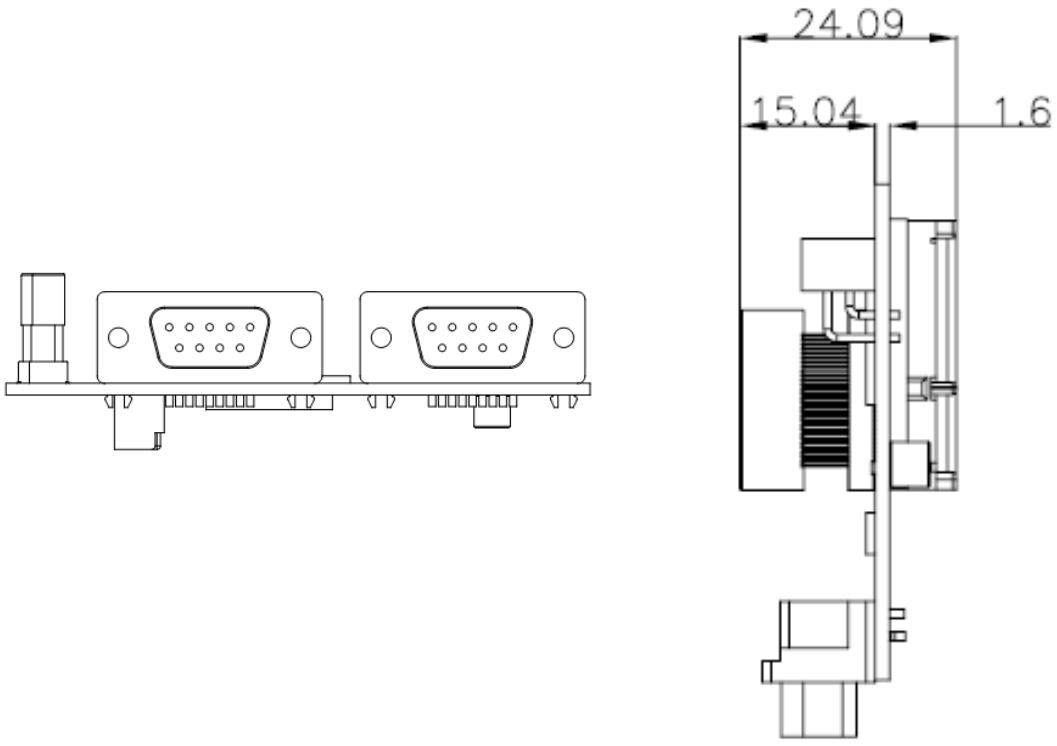
AX93262 Dimensions and Fixing Holes



Top View

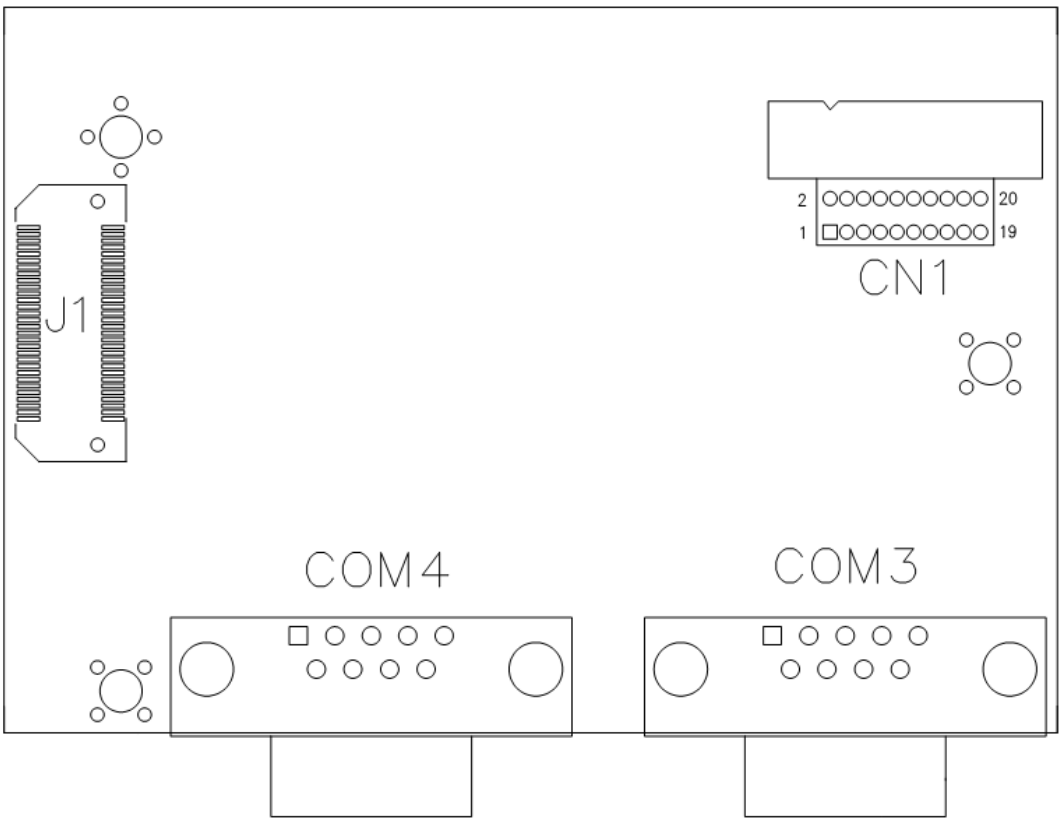


Bottom View

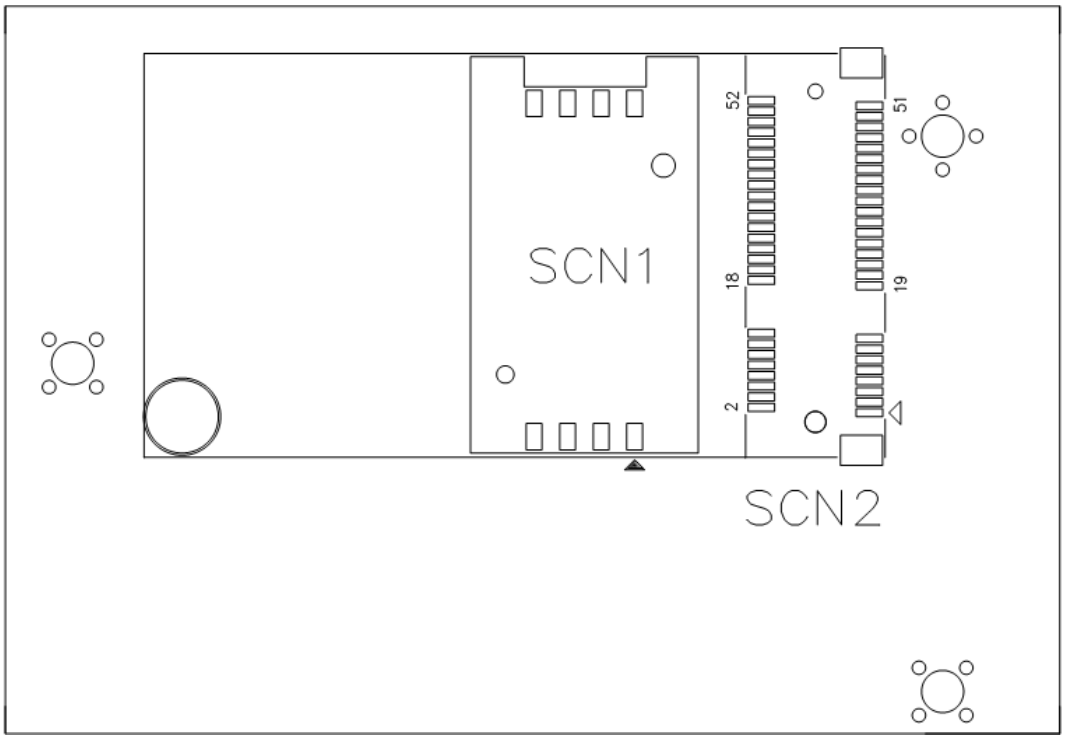


Side View

AX93262 Layout



Top View



Bottom View

Connectors

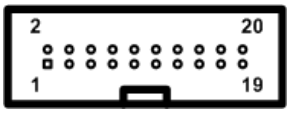
Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table which shows all connectors on the hardware.

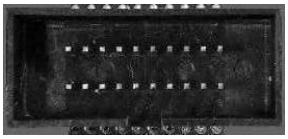
Connector	Description
CN1	COM1 and COM2 Connector
COM3	COM3 Connector
COM4	COM4 Connector
J1	ZIO Expansion Connector
SCN1	SIM Card Slot
SCN2	PCI-Express Mini Card Connector

COM1 and COM2 Connector (CN1)

The pin assignments are listed in table below.

Pin	Signal	Pin	Signal
1	DCD1	2	DSR1
3	RXD1	4	RTS1
5	TXD1	6	CTS1
7	DTR1	8	RI1
9	GND	10	N.C.
11	DCD2	12	DSR2
13	RXD2	14	RTS2
15	TXD2	16	CTS2
17	DTR2	18	RI2
19	GND	20	N.C.

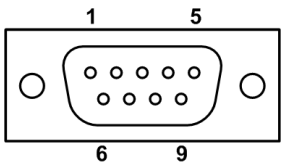




COM3 and COM4 Connector (COM3 and COM4)

The pin assignments of RS-232/RS-422/RS-485 are listed in table below. If you need COM3 and COM4 ports to support RS-422 or RS-485 mode, please refer to section 4.4.

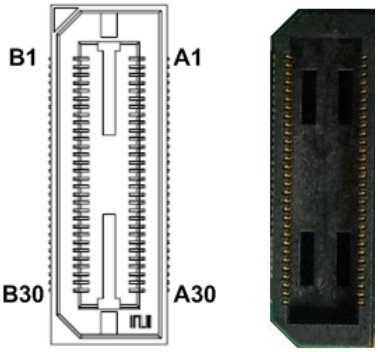
Pin	RS-232	RS-422	RS-485
1	DCD	TX-	Data-
2	RXD	TX+	Data+
3	TXD	RX+	No use
4	DTR	RX-	No use
5	GND	No use	No use
6	DSR	No use	No use
7	RTS	No use	No use
8	CTS	No use	No use
9	RI	No use	No use



ZIO Expansion Connector (J1)

The J1 is for connecting ZIO expansion module to CPU board.

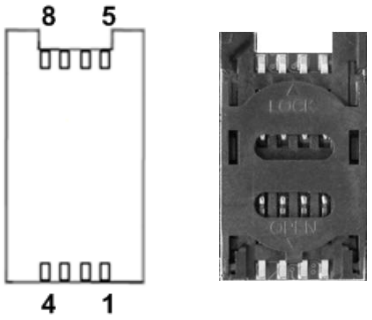
Pin	Signal	Pin	Signal
A1	+12V	B1	GND
A2	+5VSB	B2	GND
A3	+5VSB	B3	GND
A4	+3.3VSB	B4	GND
A5	+3.3VSB	B5	RSVD
A6	RSVD	B6	RSVD
A7	PWROK	B7	RSVD
A8	SMB_CLK	B8	RSVD
A9	SMB_DATA	B9	GND
A10	GND	B10	PCI-E TXP
A11	PCI-E RXP	B11	PCI-E TXN
A12	PCI-E RXN	B12	WAKE_N
A13	USBOC_N	B13	PCI-E CLKP
A14	USB DP	B14	PCI-E CLKN
A15	USB DN	B15	GND
A16	N.C.	B16	CLK_33M
A17	N.C.	B17	SERIRQ
A18	GND	B18	LAD0
A19	N.C.	B19	LAD1
A20	N.C.	B20	LAD2
A21	PLTRST_N	B21	LAD3
A22	N.C.	B22	L_FRAME
A23	N.C.	B23	GND
A24	GND	B24	N.C.
A25	N.C.	B25	N.C.
A26	N.C.	B26	N.C.
A27	N.C.	B27	N.C.
A28	N.C.	B28	GND
A29	GND	B29	N.C.
A30	N.C.	B30	N.C.



SIM Card Slot (SCN1)

SCN1 is on the bottom side of the AX93262 for inserting SIM Card. In order to work properly, the SIM Card must be used together with Mini Card which is inserted to socket SCN2. It is mainly used in 3G wireless network application.

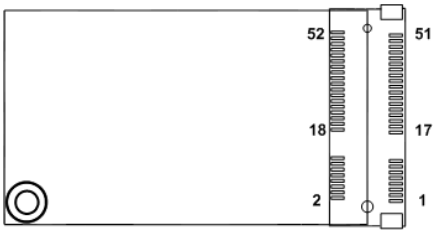
Pin	Signal
1	PWR
2	RST
3	CLK
4	NC
5	GND
6	VPP
7	I/O
8	NC



PCI-Express Mini Card Connector (SCN2)

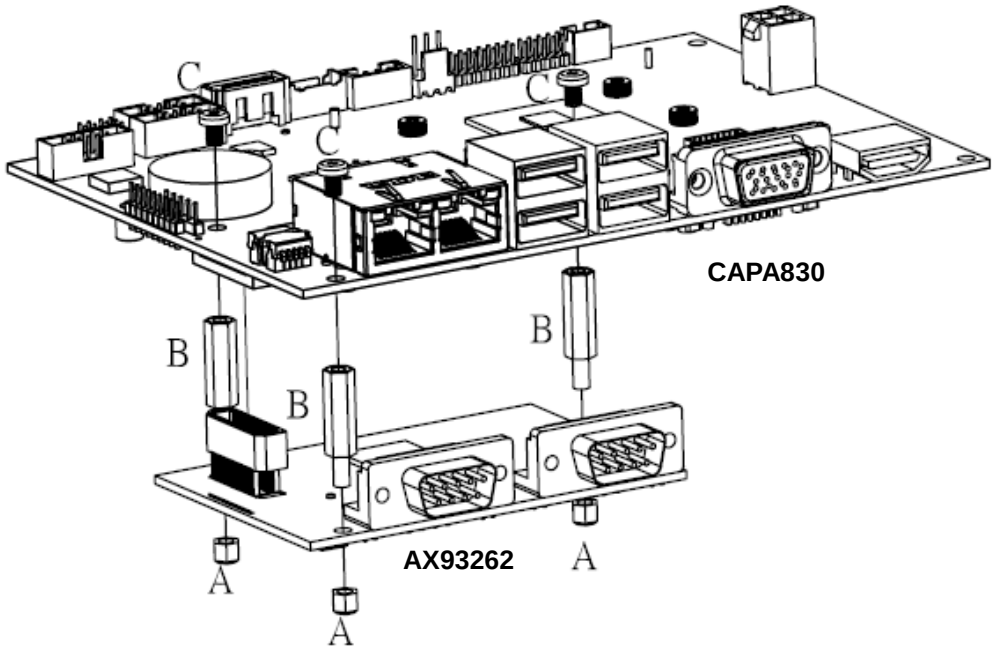
This is a PCI-Express Mini Card connector which supports PCI-Express x1 link and USB 2.0 link. A PCI-Express Mini Card can be applied to either PCI-Express or USB 2.0. It complies with PCI-Express Mini Card Spec. V1.2.

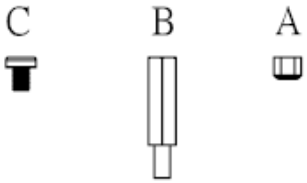
Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3VSB
3	No use	4	GND
5	No use	6	+1.5V
7	CLKREQ#	8	PWR
9	GND	10	I/O
11	REFCLK-	12	CLK
13	REFCLK+	14	RST
15	GND	16	VPP
17	No use	18	GND
19	No use	20	W_DISABLE#
21	GND	22	PERST#
23	PE_RXN3	24	+3.3VSB
25	PE_RXP3	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN3	32	SMB_DATA
33	PE_TXP3	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+3.3VSB	40	GND
41	+3.3VSB	42	LED_WWAN#
43	GND	44	LED_WLAN#
45	No use	46	LED_WPAN#
47	No use	48	+1.5V
49	No use	50	GND
51	No use	52	+3.3VSB

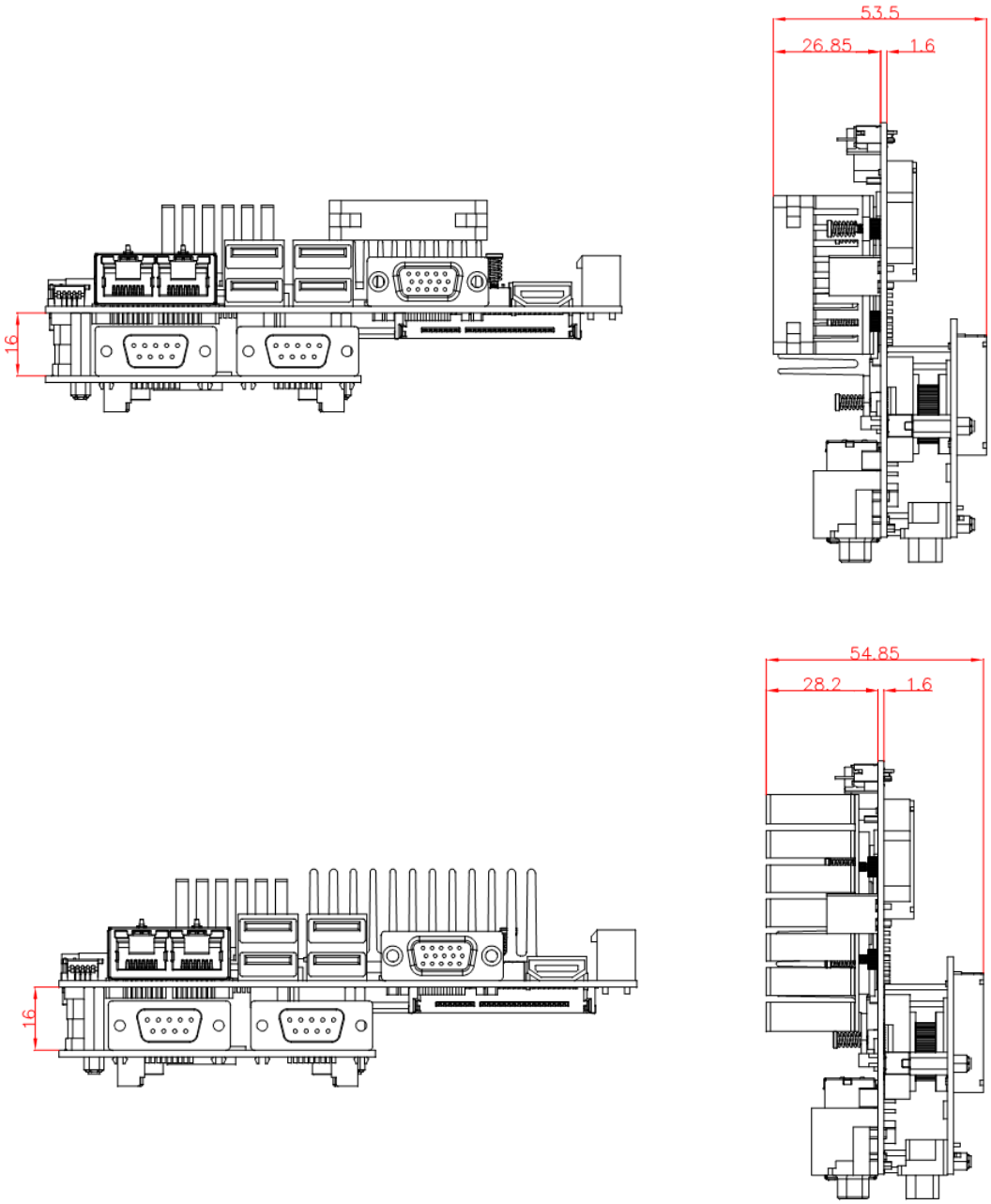


Assembly Drawing

Align assembly holes and use screws to firmly secure ZIO module to CPU board. Gently insert ZIO module into CPU board's ZIO connector. Be careful not to over-tighten the screws.







CAPA830+AX93262 – Side View

Appendix B
Watchdog Timer

About Watchdog Timer

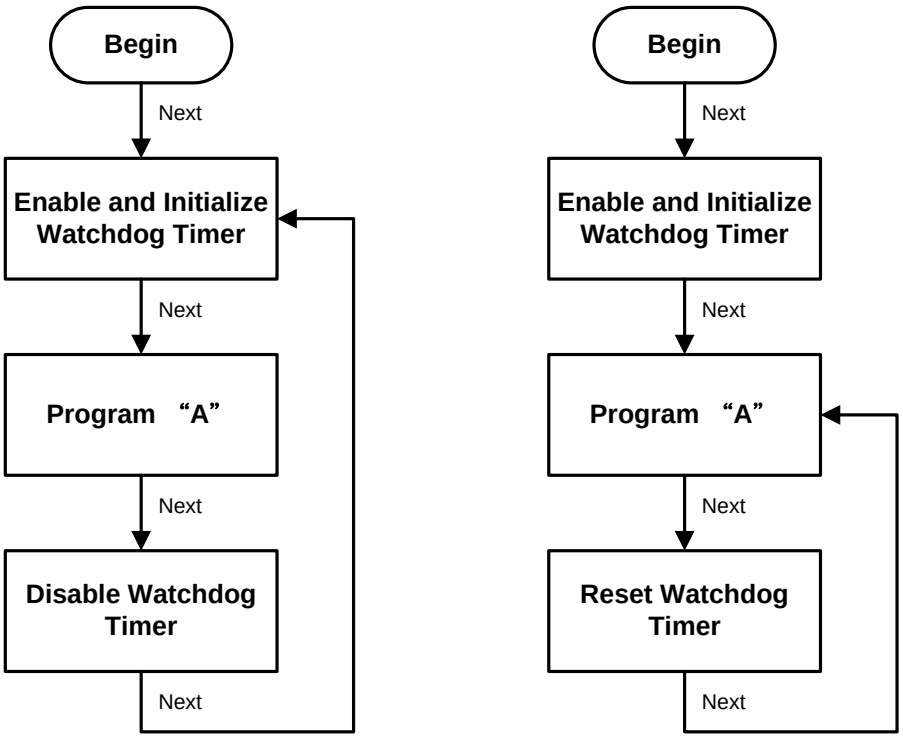
Software stability is major issue in most application. Some embedded systems are not watched by human for 24 hours. It is usually too slow to wait for someone to reboot when computer hangs. The systems need to be able to reset automatically when things go wrong. The watchdog timer gives us solution.

The watchdog timer is a counter that triggers a system reset when it counts down to zero from a preset value. The software starts counter with an initial value and must reset it periodically. If the counter ever reaches zero which means the software has crashed, the system will reboot.

How to Use Watchdog Timer

The I/O port base addresses of watchdog timer are 2E (hex) and 2F (hex). The 2E (hex) and 2F (hex) are address and data port respectively.

Assume that program A is put in a loop that must execute at least once every 10ms. Initialize watchdog timer with a value bigger than 10ms. If the software has no problems; watchdog timer will never expire because software will always restart the counter before it reaches zero.



Sample Program

Assembly sample code :

```
;Un-lock super I/O:
mov     dx,2Eh
mov     al,87
out     dx,al
out     dx,al

;Select Logic device:
mov     dx,2Eh
mov     al,07h
out     dx,al
mov     dx,2Fh
mov     al,07h
out     dx,al

;WDT Device Enable:
mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,01h
out     dx,al

;Activate WDT:
mov     dx,2Eh
mov     al,F0h
out     dx,al
mov     dx,2Fh
mov     al,80h
out     dx,al

;Set base timer :
mov     dx,2Eh
mov     al,0F6h
out     dx,al
mov     dx,2Fh
mov     al,Mh           ;M=00h,01h,...FFh (hex),Value=0 to 255
out     dx,al           ;(see below Note)

;Set Second or Minute :
mov     dx,2Eh
mov     al,0F5h
out     dx,al
mov     dx,2Fh
mov     al,Nh           ;N=71h or 79h(see below Note)
out     dx,al

;Disable WDT:
mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,00h          ;Can be disabled at any time
out     dx,al
```

***Note**:*
*If **N**=71h, the time base is set to second.*
***M** = time value*
00: Time-out Disable
01: Time-out occurs after 1 second

02: Time-out occurs after 2 seconds
03: Time-out occurs after 3 seconds
.
.
FFh: Time-out occurs after 255 seconds

*If **N**=79h, the time base is set to minute.*
***M** = time value*
00: Time-out disable
01: Time-out occurs after 1 minute
02: Time-out occurs after 2 minutes
03: Time-out occurs after 3 minutes
.
.
FFh: Time-out occurs after 255 minutes

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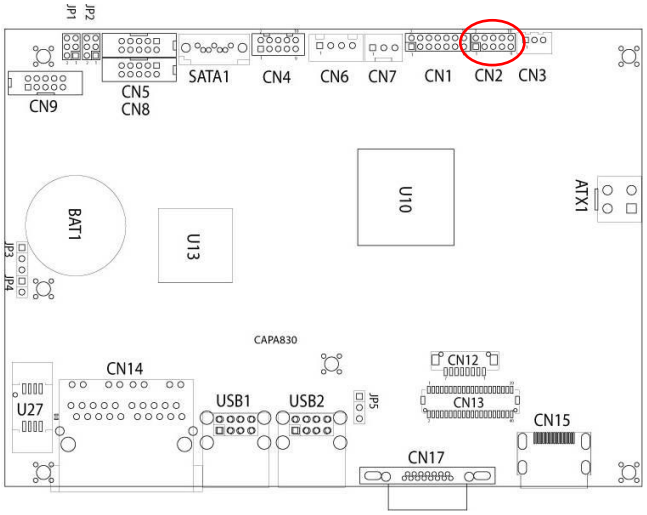
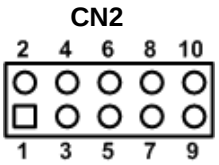
Appendix C
Digital I/O

About Digital I/O

The onboard digital I/O has 8 bits (DI0~2 and DO0~4). In default, all pins are pulled high with +3.3V level (according to main power). The BIOS default settings are 3 inputs and 5 outputs where all of these pins are set to 1. Use these GPIO signals to control cash drawers and sense warning signals from an Uninterrupted Power System (UPS), or perform store security control





Pin	Signal	Pin	Signal
1	DI0 (Bit0)	2	DO0 (Bit 0)
3	DI1 (Bit1)	4	DO1 (Bit 1)
5	DI2 (Bit2)	6	DO2 (Bit 2)
7	GND	8	DO3 (Bit 3)
9	GND	10	DO4 (Bit 4)

Sample Program

Programming sample code :

```
/*---------------- INCLUDE FILE ----------------------*/
#include <stdio.h>
#include <conio.h>
#include <bios.h>
#include <dos.h>
#define UCHAR   unsigned char
#define UINT    unsigned int
#define SMIOBASE       0xF000
/******************
       SMIOBASE can get from PCI device Bus-0,Device-31, Function-3
       Register 20h~23h, the value is the IO base address.
******************/
#define SM_REG         (SMIOBASE+3)
#define SM_ADDR        (SMIOBASE+4)
#define SM_DATA        (SMIOBASE+5)
#define SM_CMD         (SMIOBASE+2)
#define SM_STATUS      (SMIOBASE+0)
#define SM_byteAccess 0x48
#define Device_Addr    0x9C  /*depend on hardware designed Low:0x9C, High:0x6E*/
UCHAR _read_smbus(UCHAR ,UCHAR);
void _write_smbus(UCHAR,UCHAR, UCHAR);
#define F75111_CHIPID            0x0003
#define F75111_VENDORID          0x3419
```

```
/* ------------------- MAIN PROGRAM -------------------*/
main()
{
UCHAR   xch,xch2;
UINT    chipid=0, vendorid=0;
       /*Check the Chip ID information*/
       xch=_read_smbus(Device_Addr,0x5a);     /*Chip ID 1*/
       xch2=_read_smbus(Device_Addr,0x5b);    /*Chip ID 2*/
       chipid=((UINT)xch2 << 8) + (UINT)xch;
       xch=_read_smbus(Device_Addr,0x5d);     /*Vendor ID 1*/
       xch2=_read_smbus(Device_Addr,0x5E);    /*Vendor ID 2*/
       vendorid=((UINT)xch2 << 8) + (UINT)xch;
       if (F75111_CHIPID != chipid || F75111_VENDORID != vendorid )
         { printf("!!! Not found F75111 chip !!!\n");
           exit(-1);
         }
       printf("=== Found F75111 chip ===\n");
       printf("=== GPIO Output Test ===\n");

       /*set GPIO2x  direction*/
       printf("Set F75111 GPIO2x pin is output direction\n");
       _write_smbus(Device_Addr,0x20,0x1f);   /*GPIO2x Output direction*/

       /*set GPIO2x output level or plus*/
       printf("Set F75111 GPIO2x pin is output Level\n");
       _write_smbus(Device_Addr,0x23,0);      /*GPIO2x Level control*/

       /*write GPIO2x data*/
       printf("Write GPIO2x data is 0x0A\n");
       printf("GPO0=0, GPO1=1, GPO2=0, GPO3=1, GPIO4=0\n");
       _write_smbus(Device_Addr,0x21,0x0a);
       printf("Please check the GPO level and hit any key to continue\n");
       getch();

       /*write GPIO2x data*/
       printf("Write GPIO2x data is 0x15\n");
       printf("GPO0=1, GPO1=0, GPO2=1, GPO3=0, GPIO4=1\n");
       _write_smbus(Device_Addr,0x21,0x15);
       printf("Please check the GPO level and hit any key to continue\n");
       getch();


       /*set GPIO10,11,12 used*/
       printf("=== GPIO Input Test ===\n");
       printf("Set F75111 GPIO1x is used GPIO function\n");
       xch=_read_smbus(Device_Addr,0x03);
       xch &= 0xE0 ;
       _write_smbus(Device_Addr,0x03,xch);    /*set Pin GPIO10/11/12 used*/
       _write_smbus(Device_Addr,0x04,0);      /*set Pin GPIO1x used*/

       printf("Set F75111 GPIO10,11,12 is input function\n");
       _write_smbus(Device_Addr,0x10,0x00);   /*set GPIO1x input direction*/

       printf("Set F75111 GPIO10,11,12 is Level mode\n");
       _write_smbus(Device_Addr,0x13,0x00);   /*set GPIO1x Level Control*/

       xch=_read_smbus(Device_Addr,0x12);     /*read GPIO1x Status*/
       printf("Read the GPI0,1,2 input data is %02X\n",xch);
       printf("Please Change the GPIx input and hit any key to continue\n");
       getch();
       xch=_read_smbus(Device_Addr,0x12);     /*read GPIO1x Status*/
       printf("Read the GPI0,1,2 input data is %02X\n",xch);
       printf("Please Change the GPIx input and hit any key to continue\n");
       getch();
       xch=_read_smbus(Device_Addr,0x12);     /*read GPIO1x Status*/
       printf("Read the GPI0,1,2 input data is %02X\n",xch);
}

void _write_smbus(UCHAR xAddr,UCHAR xReg, UCHAR xData)
{
       while (1)
       { if (_check_smbus_busy()==0) break;
       }
```

```
        outp(SM_REG, xReg);
        xdelay();             /*because the CPU too fast,delay for IO*/
        outp(SM_ADDR, xAddr);
        xdelay();             /*because the CPU too fast,delay for IO*/
        outp(SM_DATA, xData);
        xdelay();             /*because the CPU too fast,delay for IO*/
        outp(SM_CMD, SM_byteAccess);
        xdelay();             /*because the CPU too fast,delay for IO*/
        outp(SM_STATUS, 02); /*clear interrupt status*/
}

UCHAR _read_smbus(UCHAR xAddr,UCHAR xReg)
{
UCHAR   xch,xch2;
        while (1)
        { if (_check_smbus_busy()==0) break;
        }
        outp(SM_REG, xReg);
        xdelay();             /*because the CPU too fast,delay for IO*/
        outp(SM_ADDR, xAddr+1);
        xdelay();             /*because the CPU too fast,delay for IO*/
        outp(SM_CMD, SM_byteAccess);
        xdelay();             /*because the CPU too fast,delay for IO*/
        while (1)
        { if (_check_smbus_busy()==0) break;
        }
        xch=inp(SM_DATA);
        xdelay();             /*because the CPU too fast,delay for IO*/
        outp(SM_STATUS, 2);  /*clear interrupt status*/
        return xch;
}

_check_smbus_busy(void)
{
UCHAR   xch;
        xch=inp(SM_STATUS);
        if (xch & 0x02 ) outp(SM_STATUS, 2);   /*clear interrupt status*/
        if ( xch & 0x02 ) return 1;
        if ( xch & 0x01 ) return 1;
        return 0;
}

xdelay()
{
int     xxi,xxj,xxk=0;
        for (xxi=0 ; xxi< 0x1000 ; xxi++) {
                for (xxj=0 ; xxj < 0x100 ; xxj++) {
                        xxk++;
                }
        }
}
```